SITE LOCATIONS FOR ONSHORE PETROLEUM RELATED DEVELOPMENTS

PRELIMINARY ANALYSIS OF SITES

Department of Development
February, 1981

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report constitutes a preliminary analysis of thirty-two sites in Newfoundland and Labrador which were either designated by Government or nominated by the public as potential sites for various onshore petroleum related developments. These developments included:

a) Supply/Service Base

b) Steel Platform Construction

c) Concrete Platform Construction

d) Module Fabrication and Assembly

e) Pipeline Landfall

f) Air-oriented petroleum activities

The objective of this report was to determine which sites were most suitable for the various petroleum-related activities from an environmental, physical, social and economic perspective. The criteria used for the evaluation and the ranking system established for the assessment are discussed in detail in the body of the report. The criteria were approved by the Development Planning Committee of the Offshore Petroleum Impact Committee. No weights were applied to the various criteria as this was deemed a matter for Cabinet consideration and direction. The ranking assumptions made for this exercise are arbitrary and therefore open to debate but have been consistently applied to each site. The application of the criteria required a value judgement and is therefore subject to criticism as well. Only three of the onshore petroleum activities are analyzed 1) Supply/Service Base; 2) Steel Platform Construction, and 3) Concrete Platform Construction (Condeep type).

Only one site was identified as a potential pipeline landfall and was therefore not subject to competitive analysis. Module Fabrication and Assembly can occur in any area of the Province provided there is sufficient land, an available work force and a good transportation network. However, it should be noted that economics alone would probably dictate an integrative approach to platform construction and module fabrication and assembly. The sites nominated for module fabrication and assembly all have sufficient land, a regional labour pool and good transportation networks; therefore, the ranking of sites would depend on the preferred locations for platform construction. Three areas were identified as locations for air-related developments in conjunction with petroleum activities - Goose Bay, St. John's and Gander. Preference of one site over the other would depend on the location of offshore exploratory and developments fields. Consequently, these sites were not ranked. It was assumed that each of these areas would develop as the demand for aviation support increased and would depend on the location of offshore activity. St. John's would therefore be tied to activity off the Grand Banks area, Gander to activity on the North East Coast and Goose Bay to activity off the Labrador coast.

Analysis of the three other petroleum activities was broken down into major factor categories.

1. Assessment of Critical Factors by Activity:

This assessment entailed making assumptions on the nature, scale and length of the activity and a judgement as to minimum physical requirements specific to the activity. A summary table is included with the description of each site which gives actual measurements against specifications. However, the overall summary table by activity which ranks the individual sites is assessed only in terms of whether the physical requirements are available, not available or attainable. The attainable judgement was included as it was deemed unfair to disqualify a site if the cost of making the site suitable was both reasonable and most probably a developer's cost. Each site was assessed on each of the critical factors and than ranked against each other in the overall Summary Table.

2. Assessment of Social and Environmental Factors by Activity:

Five criteria were developed each containing a number of factors. The criteria used included:

a) Availability of Infrastructure

(water, sewage, solid waste, power, housing, schools, vocational schools, medical facilities - 8 factors).

b) Availability of Labour Force

(regional labour pool and skills of unemployed - 2 factors)

c) Environmentally Acceptable

(resource conflict/compatibility, wildlife, fishery forestry, agriculture, recreation - 5 factors)

d) Proximity to Drilling/Production Activity
distance of site from Grand Banks area.

e) Availability of Transport Network
(highway, rail, air access - 3 factors).

Each factor was ranked by site, summed within the criteria and represented in the final column as a percentage of total ranking scale in the Summary Table for each Activity. The Proximity criterion was deleted for steel and concrete platform construction as it is unimportant to site location. Each site was assessed on each of the social and environmental factors and than ranked against each other in the overall Summary Table.

3. Assessment of Capital Costs Associated with Steel Development:

Each site was assessed in terms of capital cost requirements associated with each activity. Three factors were used in this category:

1) Harbour Works
2) Transportation
3) Industrial Water Supply

Order of magnitude costs were used to estimate the capital costs associated with site development and each site was ranked in terms of the total costs estimated for each site. No attempt was made to estimate social infrastructure costs which would be required as a result of a large scale development occurring in an area. It was deemed to be beyond the scope of this exercise to undertake this assessment.

Total estimated costs are ranked by site and activity in the overall Summary Tables.

There are four Summary Tables given for each of the three activities.

Summary Table I - Critical Factors - Supply/Service

Summary Table II - Site Related - Supply/Service

Summary Table III - Capital Cost Comparison - Supply/Service

Overall Summary Table I - Ranking of Sites by Major Category - Supply/Service

Summary Table IV - Critical Factors - Steel Platform Construction

Summary Table V - Site Related Factors - Steel Platform Construction

Summary Table VI - Capital cost comparison - Steel Platform Construction

Overall Summary Table II - Ranking of Sites by Major Category - Steel Platform Construction

Summary Table VII - Critical Factors - Concrete Platform Construction

Summary Table VIII - Site Related Factors - Concrete Platform Construction

Summary Table IX - Capital Cost Comparison - Concrete Platform Construction

Overall Summary Table III - Ranking of Sites by Major Category - Concrete Platform Construction

The tables follow and are self-explanatory.

Issues for Cabinet Consideration:

This exercise pointed out the complexity of ranking sites and while the exercise was intended to be preliminary only it became evident that certain issues would have to be dealt with by Cabinet before a public statement could be made on preferred sites for onshore petroleum related development.

These issues included:

1. Whether or not an additional category
   - Satellite supply/service base should be included as certain areas are already fulfilling this function.
2. The number of sites to be listed as preferred for each category of activity.
3. Whether or not development proposals received for preferred sites should be treated as a first round process thereby allowing subsequent developers to put forward proposals which might be premature at this stage of offshore petroleum development.
4. Approval of the Guidelines for Development proposals given in Appendix A.
5. Direction from Cabinet respecting the importance of social infrastructure costs associated with site selection for various petroleum activities.
6. No weighting has been applied to each of the factors which were assessed. Consequently sites cannot be ranked until some judgement has been applied to the relative importance of the physical, social, environmental and financial facets of the assessment as seen from

Government's perspective. Once weights have been determined by Cabinet for the various factors the required final ranking could be done with relative ease.

7. The issue of whether or not Government should own all preferred sites should be addressed.

N/A = Not available/attainable
Av. = Available
At. = Attainable

	CRITICAL FACTORS				
	PHYSICAL				
	HARBOUR AREA (150 acres)	MINIMUM DRAFT (33 ft.)	FORESHORE AREA (20 acres)	INDUSTRIAL AREA (200 acres)	GENERALLY ICEFREE (5%)
ARGENTIA	Av.	Av.	Av.	At.	Av.
BAY ROBERTS	At.	Av.	Av.	Av.	Av.
BOTWOOD	Av.	Av.	Av.	Av.	At.
CARMANVILLE	N/A	Av.	N/A	At.	At.
CLARENVILLE	Av.	Av.	N/A	At.	At.
CORNER BROOK	Av.	Av.	At.	At.	At.
GOOSE BAY, B.B.	Av.	Av.	At.	At.	At.
HARBOUR GRACE	Av.	At.	Av.	Av.	At.
HOPEDALE	N/A	N/A	N/A	N/A	N/A
LEWISPORTE	Av.	Av.	N/A	Av.	At.
LONG POND-MANUELS	At.	At.	Av.	At.	At.
MAIN BROOK	Av.	Av.	Av.	At.	N/A
MORTIER BAY	Av.	Av.	Av.	Av.	Av.
SEAL COVE	At.	At.	Av.	At.	At.
SHAMBLERS COVE	Av.	Av.	N/A	At.	At.
STEPHENVILLE	N/A	At.	Av.	Av.	At.
ST. ANTHONY	N/A	Av.	At.	At.	N/A
ST. JOHN'S HARBOUR	Av.	Av.	N/A	Av.	At.
ST. MARY'S	At.	Av.	Av.	Av.	Av.
PORT UNION-CATALINA	N/A	Av.	N/A	At.	At.

SUMMARY TABLE I

CRITICAL FACTORS - SUPPLY AND SERVICE

SITE RELATED FACTORS (RANKED)

SOCIAL AND ENVIRONMENTAL	AVAILABILITY OF INFRASTRUCTURE 0-80	AVAILABILITY OF LABOUR FORCE 0-20	ENVIRONMENTALLY ACCEPTABLE 0-50	PROXIMITY TO DRILLING/ PRODUCTION SITE 0-10	AVAILABILITY OF TRANSPORTATION NETWORK 0-30	%
ARGENTIA	47	19	46	6	12	69.2
BAY ROBERTS	57	20	41	9	15	78.7
BOTWOOD	52	20	35	3	18	65.0
CARMANVILLE	12	20	45	5	10	57.7
CLARENVILLE	44	20	30	8	20	72.3
CORNER BROOK	65	20	30	1	26	67.6
GOOSE BAY, B.B.	21	16	30	7	13	55.9
HARBOUR GRACE	52	20	43	9	15	78.2
HOPEDALE	10	2	50	0	0	24.5
LEWISPORTE	53	20	34	4	25	71.5
LONG POND-MANUELS	55	20	35	9	15	75.8
MAIN BROOK	5	11	42	2	0	33.1
MORTIER BAY	40	20	32	6	7	59.5
SEAL COVE	60	20	39	9	20	81.9
SHAMBLERS COVE	5	15	47	8	10	59.7
STEPHENVILLE	67	20	41	1	30	75.2
ST. ANTHONY	29	12	47	2	15	52.1
ST. JOHN'S HARBOUR	80	20	37	10	30	94.8
ST. MARY'S	22	12	45	8	14	60.8
PORT UNION-CATALINA	28	15	36	9	7	59.1

SUMMARY TABLE II

SITE RELATED FACTORS/SUPPLY AND SERVICE

CAPITAL COST COMPARISON (1980$)

TOTAL	WATER SUPPLY	TRANSPORTATION	HARBOUR WORKS	SUPPORT INFRASTRUCUTRE	
7,650,000	950,000	6,700,000	--		ARGENTIA
47,200,000	1,600,000	19,200,000	26,400,000		BAY ROBERTS
	-----	-----	------		BOTWOOD
2,300,000	1,800,000	500,000	-----		CARMANVILLE
4,700,000	200,000	500,000	4,000,000		CLARENVILLE
6,400,000	900,000	500,000	5,000,000		CORNER BROOK
19,250,000	2,500,000	13,250,000	3,500,000		GOOSE BAY, B.B.
32,900,000	4,500,000	19,200,000	9,200,000		HARBOUR GRACE
	N/A	N/A	N/A		HOPEDALE
2,500,000	-----	2,500,000	------		LEWISPORTE
22,350,000	1,650,000	11,500,000	4,500,000		LONG POND - MANUELS
6,685,000	685,000	6,000,000	----		MAIN BROOK
12,200,000	2,000,000	400,000	9,800,000		MORTIER BAY
26,700,000	700,000	20,000,000	6,000,000		SEAL COVE
8,776,000	900,000	3,476,000	4,400,000		SHAMBLERS COVE
5,300,000	60,000	----	5,240,000		STEPHENVILLE
------	-----	-------	-------		ST. ANTHONY
4,700,000	-----	4,700,000	-------		ST. JOHN'S, HR.
9,800,000		------	9,800,000		ST. MARY'S
$ 23,200,000	1,600,000	10,500,000	11,100,000		PORT UNION - CATALINA

SUMMARY TABLE III

CAPITAL COST COMPARISON - SUPPLY AND SERVICE

N/A = Not Available/Attainable
Av. = Available
At. = Attainable

CRITICAL FACTORS PHYSICAL	ARGENTIA	BOTWOOD	CORNER BROOK	GASTERS BAY	HALL'S BAY	MORTIER BAY	ST. ALBANS	SUNNYSIDE/BULL ARM
Cargo Wharf: Depth 33' Length 600'	Av.	At.	At.	At.	At.	At.	At.	At.
Dock: Depth 40' Length 350' Width 200'	Av.	At.	At.	At.	At.	At.	At.	At.
Build-up Pier: Depth 40' Length 400'	Av.	At.	At.	At.	At.	At.	At.	At.
Assembly Area: Depth 120' Length 400'	At.	At.	At.	At.	At.	At.	At.	At.
Tow Out: Min. Draft 40' Min. Harbour Depth 115 - 130'	Av.	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Foreshore Area: 20 ha (50 acres)	Av.	At.	At.	At.	At.	Av.	At.	Av.
Industrial Back-up: 60 ha (150 acres)	At.	Av.	At.	At.	At.	Av.	At.	At.
Sheltered, Protected Harbour	Av.	Av.	Av.	At.	Av.	Av.	Av.	Av.

SUMMARY TABLE IV

CRITICAL RELATED FACTORS/STEEL PLATFORM CONSTRUCTION

SITE RELATED FACTORS (RANKED)

SOCIAL AND ENVIRONMENTAL	ARGENTIA	BOTWOOD	CORNER BROOK	GASTERS BAY	HALL'S BAY	MORTIER BAY	ST. ALBANS	SUNNYSIDE/BULL ARM
0-80 AVAILABILITY OF INFRASTRUCTURE	47	52	65	3	43	40	15	34
0-20 AVAILABILITY OF LABOUR FORCE	19	20	20	16	7	20	6	11
0-50 ENVIRONMENTALLY ACCEPTABLE	46	35	30	41	33	32	37	45
0-30 AVAILABILITY OF TRANSPORTATION NETWORK	12	18	26	17	17	7	15	14
%	71.4	73.8	82.0	58.1	52.9	59.3	42.2	58.5

SUMMARY TABLE V

SITE RELATED FACTORS/STEEL PLATFORM CONSTRUCTION

CAPITAL COST COMPARISON (1980$)

	TOTAL	INDUSTRIAL WATER SUPPLY	TRANSPORTATION	HARBOUR FACILITIES	SUPPORT INFRASTRUCTURE	
	7,600,000	950,000	6,700,000			ARGENTIA
	2,150,000	-	-	2,150,000		BOTWOOD
	5,600,000	900,000	500,000	4,200,000		CORNER BROOK
	11,000,000	1,750,000	750,000	8,500,000		GASTERS BAY
	4,750,000	1,250,000	-	3,800,000		HALL'S BAY
	6,650,000	1,750,000	400,000	4,500,000		MORTIER BAY
	5,500,000	2,000,000	-	3,500,000		ST. ALBAN'S
	6,700,000	1,200,000	500,000	5,000,000		SUNNYSIDE/BULL ARM

SUMMARY TABLE VI
CAPITAL COST COMPARISON - STEEL PLATFORM CONSTRUCTION

N/A = Not Available/Attainable
Av. = Available
At. = Attainable

PHYSICAL	BULL ARM	CORNER BROOK	COME BY CHANCE	HALL'S BAY	HERMITAGE BAY	ST. ALBANS	TERRENCEVILLE
Cargo Wharf: Depth 33' Length 500'	At.	At.	At.	At.	At.	At.	At.
Dry Dock: Dept. 33' Length 650' Width 650' Channel width 800'	At.	At.	N/A	At.	At.	At.	At.
Buildup Site: Depth 260' Width 800'	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Deep Sink Site: Min. depth 660' Min. width 800'	Av.	Av.	Av.	Av.	Av.	Av.	Av.
Tow Out: Min Depth 425' Min Width 2000'	Av.	Av.	Av.	Av.	Av.	Av.	N/A
Foreshore Area: 20 ha (50 acres)	Av.	At.	At.	At.	At.	At.	At.
Industrial Land: 60 ha (L50 acres)	At.	At.	At.	At.	N/A	At.	At.
Sheltered Protected Harbour	Av.	Av.	N/A	Av.	Av.	Av.	At.

SUMMARY TABLE VII

CRITICAL FACTORS - CONCRETE PLATFORM CONSTRUCTION

SITE RELATED FACTORS (RANKED)

SOCIAL AND ENVIRONMENTAL		BULL ARM	CORNER BROOK	COME BY CHANCE	HALL'S BAY	HERMITAGE BAY	ST. ALBANS	TERRENCEVILLE
AVAILABILITY OF INFRASTRUCTURE	0-80	34	65	30	43	6	15	25
AVAILABILITY OF LABOUR FORCE	0-20	11	20	11	7	6	6	10
ENVIRONMENTALLY ACCEPTABLE	0-50	45	30	43	33	45	37	47
AVAILABILITY OF TRANSPORTATION NETWORK	0-30	14	26	25	17	5	15	5
%		58.8	82.0	65.5	52.9	36.0	42.2	48.0

SUMMARY TABLE VIII

SITE RELATED FACTORS - CONCRETE PLATFORM CONSTRUCTION

CAPITAL COST COMPARISON (1980$)

	TOTAL	INDUSTRIAL WATER SUPPLY	TRANSPORTATION	HARBOUR FACILITIES	
	27,600,000	1,200,000	400,000	26,000,000	BULL ARM
	26,700,000	1,000,000	500,000	25,200,000	CORNER BROOK
	26,600,000	1,200,000	1,000,000	24,000,000	COME BY CHANCE
	25,750,000	1,250,000	-	24,500,000	HALL'S BAY"
	27,750,000	3,000,000	250,000	24,500,000	HERMITAGE
	26,700,000	2,200,000	-	24,500,000	ST. ALBAN'S
	27,300,000		2,800,000	24,500,000	TERRENCEVILLE

SUMMARY TABLE IX

CAPITAL COST COMPARISON - CONCRETE PLATFORM CONSTRUCTION

DESCRIPTION OF OVERALL SUMMARY TABLES "RANKING OF SITES BY MAJOR CATEGORIES"

Critical Factors

The assessment of critical factors was predicated upon the "existing" physical parameters associated with each site as it related to its particular category of nomination. Each site parameter was assessed in terms of whether it was immediately available without major constraints; whether it was attainable by physical modications to the site or being in close proximity; and whether it was not attainable in any case.

It bears reiterating that the sites are assessed on the basis of existing conditions and does not preclude the fact that the ability of each and any site to meet the physical requirements depends on how much capital expense one is willing to undertake.

Consequently, sites were ranked preferentially on the basis of the ratio of available factors to attainable factors to not-attainable factors.

Social and Environmental Factors

Social and environmental factors dealing with each site were ranked from 0 to 10 according to the ranking assumptions explained in detail in the section on "Ranking Assumptions".

It should be noted that each factor is ranked from 0 to 10 and where any one "site related factor" deals with more than one sub-factor, its corresponding rank is the cumulative total of each of the sub-factors.

It should also be noted that the ranking of these factors remain unweighted and weighting of any factor or sub-factor may radically effect the final ranking.

Finally, the preferential selection of sites is based on the assessed rank for each factor divided by the sum total of ranking possible to provide a percentage of total ranking.

Cost Factors

Cost factors were assessed for harbour works (dredging, construction of wharves, etc.) transportation (construction of roads) and industrial water supply (provision of same or tie-in to existing). It should be noted that these figures are estimates based on unit costs for particular items (1980$) and are not exhaustive nor conclusive.

Preferential selection of sites is based on anticipated least cost to government. It should also be noted that a portion of costs associated with harbour facilities may be borne by the developer but those cost sharing arrangements are unknown at present.

OVERALL SUMMARY - TABLE I

RANKING OF SITES BY MAJOR CATEGORIES

SUPPLY/SERVICE BASE

Site	Critical Factors	Social and Environmental Factors	Cost Factors	Total
Botwood	2	11	1	14
St. John's	1	1	5	17
Argentia	2	9	10	21
Lewisporte	11	8	4	23
Bay Roberts	2	3	19	24
Corner Brook	7	10	8	25
Clarenville	14	7	5	26
St. Mary's	2	12	12	26
Stephenville	14	6	7	27
Mortier Bay	1	13	13	27
Long Pond-Manuels	9	5	14	28
Seal Cove	9	2	17	28
Harbour Grace	6	4	18	28
Carmanville	17	16	3	36
St. Anthony	18	18	1	37
Shambler's Cove	14	14	11	39
Main Brook	11	19	9	39
Goose Bay, B.B.	7	17	15	39
Port Union-Catalina	18	15	16	49
Hopedale	20	20	20	60

OVERALL SUMMARY - TABLE II

RANKING OF SITES BY MAJOR CATEGORIES

STEEL PLATFORM CONSTRUCTION

Site	Critical Factors	Social and Environmental Factors	Cost Factors	Total
Botwood	3	2	1	6
Corner Brook	5	1	4	10
Argentia	1	3	7	11
Mortier Bay	2	4	5	11
Hall's Bay	5	7	2	14
Bull Arm	3	5	6	14
St. Alban's	5	8	3	16
Gasters Bay	8	6	8	22

OVERALL SUMMARY - TABLE III

RANKING OF SITES BY MAJOR CATEGORIES

CONCRETE PLATFORM CONSTRUCTION

Site	Critical Factors	Social and Environmental Factors	Cost Factors	Total
Hall's Bay	2	4	1	7
Corner Brook	2	1	4	7
Bull Arm	1	3	5	9
St. Albans	2	6	2	10
Come By Chance	7	2	3	12
Hermitage	5	7	6	18
Terrenceville	6	5	7	18

INTRODUCTION

INTRODUCTION

This report constitutes a preliminary analysis of thirty-two sites in Newfoundland and Labrador which were designated by Government or nominated by the public as potential sites for various petroleum related developments. Information was obtained from published documents and with the help of various government departments, particularly the Provincial Planning Office. Site visitations were undertaken for most of the sites in corroboration of the data as time and weather conditions permitted.

The objective of this report was to assess the advantages and disadvantages of each site nominated for the various petroleum activities in relation to specific industry requirements and potential impact on communities and determine which sites were most suitable from an economic, social, physical and environmental perspective.

The criteria used for the evaluation is given in the next section, along with the rating system established for the assessment. Although the same criteria was applied to each of the sites, information was more readily available for some sites than others, consequently some areas are more detailed. The exercise was limited to use of available information in preparing the report and the conclusions which are drawn are based on that information.

It should be noted that this was a preliminary evaluation and that any specific development proposals which might be forthcoming will require a more formal and detailed assessment process.

Each site is dealt with separately and summary tables and comments giving the ranking of each site in relation to specific parameters and specific activity are given at the beginning of each site description.

An overall summary table has been completed for three of the petroleum related activities:

1) Permanent Supply/Service Base
2) Steel Platform Construction
3) Concrete Platform Construction

Only one site was initially identified as a pipeline landfall and is not subject to the competitive process. Airport related activities in support of offshore petroleum operations can occur in each of the three areas identified - Goose Bay, Gander and St. John's. Land demands in each of these areas will depend on the level of traffic associated with offshore operations, the location of exploration and development fields and the level of support industries requiring an essential link to both the airport and to the offshore industry.

Module Fabrication and Assembly operations connected with offshore petroleum development are not as site specific as other onshore petroleum related developments. Any area which has an available qualified labour pool, a good transportation network and a suitable land area could potentially compete for module fabrication opportunities. However, in any operation it is important to minimize costs and economics alone might dictate an integrated approach to module fabrication and platform construction where it is feasible to do so.

CRITERIA USED FOR SELECTION OF

A. SUPPLY/SERVICE BASE

B. STEEL PLATFORM CONSTRUCTION

C. CONCRETE PLATFORM CONSTRUCTION

A. Definition of Permanent Offshore Supply/Service Base: Nature of Activity

The main purpose of a supply/service base is to transfer materials to and from offshore operations. While there are two major categories of bases, temporary and permanent, the former is used to support exploration and exploratory drilling while the latter is used not only for exploration but to support the development and production stages. As such a permanent supply/ service base has a much greater scale of activity and its location is determined by a different set of factors, although there are some requirements which are common to both. A permanent base, in addition to its supply function, must also provide facilities for longer term storage of goods required for offshore operations, maintain repair and maintenance facilities for supply vessels, drilling rigs and platforms and provide adequate space for the different companies and suppliers connected with the oil industry.

These latter facilities do not necessarily have to be located in the vicinity of the marine installations, but a tremendous advantage, both in building costs and efficiency of operations, can be obtained by having the two types of facilities in one area.

B. Assumptions

Scale of Activity: For purposes of the site location exercise it has been assumed that both an exploration program and a development program will be supported by the supply/ service base.

Exploration Program	- 14-16 rigs per year 1982-1992; 10-Grand Bank Area.
Development Program	- 4 semi-submersible platforms with separation facilities. 1 major storage/offloading facility.
	- minimum of 40 supply vessels for support of both programs.
Location of Development/ Production Activity	- Grand Bank Area only 1982-1992

Critical Site Requirements

- all weather protected harbour (minimum 150 acres) 60 ha
- minimum water depth at dockside (33 ft.) 10 m L.W.O.S.T.
- minimum foreshore area (20 acres) 8 ha with maximum 3% slope
- minimum industrial back-up land (200 acres) 80 ha
- generally ice free, less than 5% interference

Economic Factors Related to Overall Concept

- proximity to Drilling/Production Activity

For purposes of this preliminary site location exercise it was assumed that in the next ten (10) years the only probable offshore petroleum development activity would occur in the Hibernia area located 190 miles east of St. John's. Both fuel and time costs increase significantly with the distance between the supply base and the production site, affecting the cost of goods and services required. While the exact economic impact of distance requires a separate study some judgement can be made.

- Availability of Good Transportation Access

This item is important in keeping transportation costs to a minimum. Both goods and services and personnel must be able to move efficiently on a continuous basis. Any disruption to operations could be costly. Good highway access is essential to movement of goods from origin to distination; both rail and marine modes have been considered, for, if fuel costs increase drastically either mode may prove more economical. Proximity to a major airport is also required for the movement of specialists and specialty goods.

- Harbour Access in all weather

The nature of supply/service base operations requires a 24 hour/day seven day/week operating system. Any blockage of the harbour for various reasons would affect operating costs and efficiency.

- Availability of work force at site and/or within reasonable commuting distaance (45 minute commutershed)

Proximity to the site to a skilled labour force with a background in construction trades is an important factor both in terms of the viability of the operation itself and the stress put on existing infrastructure.

- Availability of existing infrastructure to support operation and labour force. This includes both physical and social infrastructure

Locating the supply/service base at a site with a well established infrastructure base will minimize society's additional costs of providing such services and allow for attracting new workers to settle in the area.

Site Specific Related Factors

- Sufficient large and protected basin for operations of vessels, including turning, manoeuvring, anchorage while awaiting berthing, provisioning, fueling, and repairs. Minimum was set at 150 acres (60 ha).
- Minimum water depth of 33 ft. (10 m) LWOST to accommodate cargo as well as supply vessels.
- Adequate foreshore land area suitable for location of facilities must be relatively flat, maximum slope 3%. Flat land is an important requirement due to adverse effects of excessive gradients on yard vehicle operation. Additional land may also be required for a buffer zone and waste dump. While there are a number of activities that can be separated from the dock area some facilities must be located at the waterfront - mud and cement silos, some pipe storage, some warehousing, office space, parking,

vessel loading equipment. Water and fuel supply, A minimum of 20 acres (8 ha) has been established.

- Access to harbour is not limited by weather conditions (particularly waves and ice) and that the probability of ice interference is less than 5%.
- Availability of fresh water supply is a significant factor as it is the highest volume item required for well drilling. 5,500 m^3/exploratory well and 4,500 m^3/development well or 1,250,000 gals/well.
- Availability of power supply

  Three phase power service would be required for site.
- Adequate backup industrial land

  There are numerous support services which are necessary in the vicinity of a supply base. It has been estimated that approximately 100 acres (40 ha) will be required for heavy industrial users such as mud companies, oil well cement suppliers, pipe storage contractors and another 100 acres (40 ha) for light industrial users - well head equipment companies, completion and production service companies, caterers, testing services, and other supply and service companies. Companies can be located on separate sites provided adequate highway and/or rail access is possible to the base.
- The location of the site must be environmentally acceptable and with the exception of a short term construction impact acceptable environmental practises, eg. (treatment of sewage,

waste water, etc.) will ensure no major environmental consequence. Sites were also considered from the perspective of resource land use compatibility and the degree of competition between various resources uses.

- Comparison of capital costs assocated with development of facility at each site.

This is an important factor in overall site selection assessment. Order of magnitude costs have been developed on the basis of information obtained from various sources, including contractors experienced in; a) harbour works b) highway, c) industrial water systems. The following was used as base figures:

a) Wharves - heavy duty steel piled with concrete deck and 60 ft. width. $7,000 per linear foot.

b) Breakwaters - concrete cribs $300 per m^3.

c) Industrial Water System - 8" ductile in place $350 per metre

d) Average dam - $200,000

e) Highways - $250,000 per kilometer

f) Bridges (average) - $500,000

g) Dredging - $5.20 per m^3

It must be realized that many of the attributes of the sites applied to the criteria are subjective in nature, but those that were quantifiable were listed in that fashion.

Following is a list of the type of information collected for each site:

1. Size of Protected Harbour Area (headland to headland).

2. Channel Depths
3. Channel Widths
4. Size of Turning Basin
5. Tidal Variation
6. Maximum Wave Height
7. Frequency and type of ice cover
8. Existing wharfage and docking facilities
9. Seabed Conditions
10. Surficial geology of site (topography)
11. Distance of Site to Drilling/Production Activity
12. Industrial Land availability
13. Residential land availability
14. Services Availability - water, sewer, power, solid waste disposal
15. Infrastructure availability - housing, schools, medical facilities
16. Transportation Access - highway, rail, air
17. Existing resource utilization - fisheries, forestry, agriculture, wildlife, recreation
18. Labour Force availability - labour force by occupation, unemployed by occupation, regional labour pool
19. Existing municipal and planning status

Sites nominated as potential Supply/Service Bases.

1. Argentia
2. Bay Roberts - Spaniards Bay
3. Botwood
4. Carmanville
5. Clarenville

6. Corner Brook
7. Goose Bay, Bonavista Bay
8. Harbour Grace
9. Hopedale
10. Lewisporte
11. Long Pond, Manuels
12. Main Brook
13. Mortier Bay
14. Port Union - Catalina
15. Seal Cove
16. Shamblers Cove - Greenspond
17. Stephenville
18. St. Anthony
19. St. John's, Harbour
20. St. Mary's Harbour

Happy Valley - Goose Bay, Gander and Torbay Airport were also nominated as sites for supply/service base but have been treated separately under Air Related Industrial Parks in conjunction with Petroleum Related activities.

Critical Site Related Factors Table I

1. Foreshore Area - 20 acres (8 ha).
2. Industrial Land - 200 acres (80 ha).
3. Sheltered Protected Harbour - 150 acres (60 ha).
4. Minimum Water Depth - 33 ft. (10 m).
5. Generally ice free - 5% interference.

To be

Economic Related Factors (Weighted) Table II

1. Proximity to Drilling/Production Activity
2. Availability of transport network
3. Harbour Access in all weather
4. Available labour force
5. Available infrastructure
6. Environmentally acceptable

Capital Cost Comparison Table III

B. Steel Platform Construction
Nature of Activity

Semi-submersible platform construction is a relatively new production technology. Stages of semi-submersible fabrication include construction of pontoons or ship hulls on launch pads or at building berth; subsequent erection of semi-submersible columns and cross-bracing the pontoons at an assembly wharf; mating the sub-structure to the prefabricated platform at a deep, protected, water site, and final fitting out and testing at wharfside. Fabrication of on-deck components or modules need not necessarily be done in the platform yard but their installation takes place as part of the fitting-out operation. Most structural steel fabrication is done in the yard.

Assumptions

Scale and Length of Activity:

The layout, requirements, and impacts of the fabrication yard are determined, in large part, by the number and complexity of platforms being constructed annually as well as the number of platform components or modules fabricated on the site. For purposes of this exercise full fabrication of (4) four semi-submersible platforms has been assumed. A period of 18 months is assumed for completion of each platform. Activity can occur simultaneously or continuously and a level of 320 people/platform is assumed.

Critical Site Requirements

- Requirements for cargo wharf
  Depth 33 ft., length 600 ft.
- Requirements for Dock or Slipway
  Depth 40 ft., width 200 ft., length 350 ft.
- Requirements for build-up pier
  Depth 40 ft., length 400 ft.
- Requirements for Assembly Area
  Depth 120 ft., length 400 ft.
- Requirements for Tow-out
  Minimum draft 40 ft., Maximum harbour depth 115 ft. - 130 ft.
- Minimum Foreshore Area
  20 hectares (50 acres)
- Minimum Industrial Backup Land
  60 hectares (150 acres)
- Sheltered Protected Harbour

Other Site Related Factors

Same as for Supply/Service Base. Except proximity to Drilling/Production Activity is not considered as an important factor in assessment.

Sites nominated for Steel Platfrom Construction

Argentia
Botwood
Corner Brook
Gasters Bay
Hall's Bay
Mortier Bay
St. Albans
Sunnyside/Bull Arm

C. Concrete Platform Construction (Condeep Gravity Type)

Nature of Activity:

Concrete gravity platforms for drilling and production of offshore oil and gas were developed for North Sea explortation. They provide storage capacity as well as drilling and pumping facilities and can develop a field drilling from 1 to 50 wells. Concrete platforms require relatively short installation times since equipment and modules are installed in sheltered water near the fabrication site.

Assumptions:

It has been assumed for purposes of this exercise that a concrete gravity structure could be built in the Province. Whether or not this is a preferred production system is still in debate and new technology is recently available for the design of floating concrete structures.

Scale and Length of Activity:

1) Construction of platform base (cylindrical prestressed concrete cells in drydock adjacent to deep water)
9 months
2) Further vertical construction in water 50 - 100 metres after filling ballast cells in base to partially submerge for deep water drilling, concrete pillars constructed
9 - 15 months

Submergence test, attachment of steel deck section, superstructure, modules.

Refloat to towing depth

Total fabrication time: over 2 years

Critical Site Factors:

- Requirements for cargo wharf 33 ft. depth, length 500 ft.
- Requirements for Dry dock Depth 33 ft., length 650 ft.
  Width 650 ft., channel width 800 ft.
- Requirements for Buildup Site - Depth 260 ft., width 800 ft.
- Requirements for Deep Sink Site - Min. depth 660 ft. (110 fathoms)
  Min. width 800 ft. (240 m)
- Requirements for tow-out to Sea - Min. depth, 425 ft.
  Min. width 2000 ft.
- Minimum Foreshore Area - 20 hectares (50 acres)
- Minimum Industrial Backup Land - 60 hectares (150 acres)
- Sheltered Protected Harbour

Other Site Related Factors

Same as for Supply/Service Base with exception of Proximity to Production Site. This factor not deemed important.

Sites nominated for Concrete Platform Construction

Bull Arm
Come By Chance
Corner Brook
Hall's Bay
Hermitage
St. Albans
Terrenceville

RANKING ASSUMPTIONS

Ranking Assumptions

Ranking is an extremely difficult process as value judgements are subjective and therefore open to debate. However, in order to carry out this exercise some assumptions had to be made to enable the assessment of sites. The following assumptions have been made respecting the factors used for social and physical infrastructure, resource utilization and conflict and labour force availability.

A. Social and Physical Infrastructure

1. Services Availability

Water supply, power supply, sewage disposal and solid waste disposal will be required for a supply base, for steel or concrete platform construction, for module fabrication and assembly, and for a pipeline landfall. The exact requirements will depend on the type and scale of operation. Assessment was based on whether or not a service was available with sufficient excess capacity to serve petroleum activities. A rank of 0 indicates that no service is available and that a major installation would be required; 5 indicates an existing service with minor upgrading required and 10 indicates there is an existing usable system. This same ranking was used for each of the four services.

2. Existing Infrastructure

The amount of in-migration associated with the different petroleum activities will vary with each site and

and the size of the labour pool available. Experiences elsewhere indicate that local labour content tends to fluctuate between 30% and 60%. Employment could range from a low of 50 jobs to a high of 600 jobs depending on the type and scale of activities. Without specific data available to determine the potential in-migration level, ranking was based on the ability of the area to support a moderate residential demand of 200 lots, or, depending on density, 25-30 acres. A rank of 10 indicates adequate existing residential lots and/or infilling capacity; a rank of 5 indicates adequate residential land with a moderate cost for servicing; and 0 indicates undeveloped land and no services in community or a major project to provide sufficient capacity.

Schools:

Schools were ranked on the basis of existing excess capacity. A maximum level of 400 students in all levels of the school system was chosen and given a rank of 10. Sites were then ranked on present existing excess capacity on a range of 0 - 10.

Vocational Schools:

Access to vocational training was considered an asset. The opportunity to train local labour to meet requirements of the industry is critical to optimizing benefits from new development. A rank of 10 indicates that there is a vocational school in the site area and additional schools within a reasonable commuting distance; a rank of five (5) indicates a vocational school but not specifically geared to mechanical trades an 0 indicates no vocational school within area.

Access to Medical Facilities:

With the in-migration of labour additional strain can be expected on existing medical facilities. For purposes of ranking 10 indicates that full hospital services are available within a half hours drive from the site; 5 points indicates that there is a cottage hospital in the area which could respond to some forms of illness but would not be adequate to treat major accidents; an 0 indicates no hospital facilities available.

3. Transportation Network

Highway Access:

This factor is considered critical to any efficient industrial operation. Ranking was done on the basis of existing road networks being able to support a fairly high volume of tractor trailer traffic. A rank of 10 indicates an existing good highway network; 5 an existing network which would require only moderate upgrading and 0 the installation of a major new highway.

Rail Access:

Given the rising cost of fuel, rail access was looked at as an alternative mode of transport for heavy materials. Sites were ranked on the basis of distance from nearest rail line. No attempt was made to estimate construction costs of spur lines to sites. 10 indicates an existing usable line within less than five miles. 5 indicates access within 50 miles or a requirement for upgrading of an existing line and 0 indicates no rail access within a 100 miles of site.

Airport Access:

Close access to a major airport, with national or international service, is highly desirable and this factor was ranked on distance only to the nearest commercial airport. 10 indicates access within 10 miles; 5 within 50 miles and 0 access 100 miles or greater. It was assumed that in all cases existing air-strips might not be suitable or that a heliport would be required.

Marine Access:

No ranking was done as all sites are either ports or connected to ports and marine characteristics are assessed in detail under physical characteristics which will be discussed later.

B. Environmental Considerations

Given that a major environmental impact statement would be required for any large scale onshore petroleum development, this exercise focussed only on a qualitative assessment of present and potential resource use and land capability in terms of agriculture, forestry, fisheries, wildlife and recreation. Each site was assessed in terms of present level of resource activity. High employment in any resource sector was taken as indicative of an active resource industry which might be sensitive to disruption or to skilled manpower drainage effects. Resources information was collected on an area basis using a 45 minute commutershed or 25 - 30 mile radius around proposed sites. Caution should be exercised in the use of these figures as overlapping has occurred for many of the sites and the figures should not be construed as representing site areas only.

Ranking was done on the basis of conflict with existing resource use and involved a qualitative judgement and may be open to criticism. With that in mind however, a rank of 10 indicates no potential conflict with existing resource and 0 indicates high competition with prorating in between.

In ranking the fishing industry as the index compared all sites on the basis of the number of licensed inshore fishing vessels, an estimate of the number of man years employment in fish processing, the scale of landings locally and whether the area is an offshore trawler port or not. A high level of inshore and offshore activities was felt to be sensitive to any development.

C. Labour Force Availability

Sites were assessed on the basis of the ability of the area to meet labour force demands. Information on labour force by occupation was available only for 1971 and as such is very unreliable in terms of existing labour force. The

1976 census figures for labour force are not broken out by occupation, but these or the number of 1978 taxpayers were used as an indication of size of labour force. A catchment area of 45 minutes or 25 - 30 miles was used for planning purposes. Unemployment figures for January 1981 were also used. These figures do not accurately correspond with the 1976 census areas as they are compiled on the commutershed or 45 minutes. However they do give an indication of unemployed by occupation who would be available for employment generated by new developments. The skills of most interest for service base operations are general labourers, transport equipment operators and marine related occupations. For steel platform construction and concrete platform construction a higher trades component is required. It was agreed that without regional information, which was unavailable, on the pool of specific skills required, both employed and unemployed, it was impossible to estimate the labour force resident in the region who would be available for employment at the site and therefore what the potential in-migration might be.

Given this handicap, the assessment of both regional labour supply and skills must be reviewed with caution. In terms of labour demand a figure of 250 was used for supply/ service base and a figure of 1000 for both steel and concrete platform construction and an assumption made on skill makeup- 1/3 skilled trades for supply/service base (i.e. 100-10 points) and concrete platform construction (300-10 points) and 2/3 skilled for steel platform construction and module fabrication and assembly (600 = 10 points). Ranking was based on size of the pool of unemployed general construction and labour workers and the pool of skilled workers with fabrication experience who were unemployed. A rank of 10 indicates adequate qualified labour available and 0 inadequate with prorating in between.

It must be noted however, that the mobile nature of Newfoundland's labour force could have a significant impact on labour force availability. This factor would have to be assessed more thoroughly than the time allowed for this preliminary review.

D. Physical Site Related Factors

Ranking was not undertaken for physical characteristics associated with harbour, foreshore and hinterland as specific minimal requirements were set in order for a site to qualify in the first instance. These physical factors are therefore discussed only in terms of being available, non-available or attainable. The category of attainable was used to distinguish those sites which could be made suitable at reasonable costs; and where these costs would most likely be developer's costs. It was determined unfair to disqualify a site which to all intents would be suitable provided some physical changes were undertaken and which would not be a major committment for government.

E. Cost Implications to Government for Infrastructure support

In assessing each of the sites an attempt was made to estimate likely infrastructure requirements associated with site development only, in the first instance. No attempt was made to determine social infrastructure costs at this stage because there is insufficient information on which to make such an assessment. This type of assessment is more appropriate to evaluation of specific development proposals in terms of cost and benefit to the Province and is the next stage in the overall process of controlling onshore petroleum related developments. Estimates of site development costs are therefore given only for

a) harbour works
b) transport infrastructure
c) Industrial water supply

Weighting:

When the criteria was originally established, weights were applied to each of the site related factors which were being ranked. However, when this criteria was reviewed by the Development Planning Committee of the Offshore Petroleum Impact Committee (O.P.I.C.) it was consensus of the group that the establishment of weights should be a matter for Cabinet consideration and that Cabinet should decide how important each factor was on the overall assessment. Consequently the comparison Summary Tables which have been done for Supply/Service Base, Steel Platform Construction and Concrete Platform construction (Condeep Type) show only a summation of the ranks and a percentage for each site of the total spread for each variable. While this is not a weighting it does give an indication of the suitability of each site by major factor and

and allows preliminary preferential selection.

Once Cabinet decides what weights should be applied to each of the ranked variables the exercise can be undertaken with relative ease as the ranks are specific for each variable used in the major factors.

SITE PROFILES

SITE PROFILES

For each of the sites which have been evaluated all or some of the following information has been tabulated. As previously indicated information was more readily available for some sites than others. The format used included.

A. General Description of Area

- regional setting
- location of site
- transport routes
- population

B. Description of Harbour, Foreshore and Hinterland

- protected harbour area
- channel depth
- channel width
- harbour depth
- approach entrance
- turning basin
- existing wharfage and docks
- ice restricted access
- wave restricted access
- wind direction and speed
- fog
- currents
- tidal variation
- seabed conditions

- proximity to drilling/production activity
- land availability - foreshore
- industrial land availability
- topography (surficial geology)

C. Physical and Social Infrastructure

- water supply
- power supply
- sewage disposal
- solid waste disposal
- housing (residential land availability)
- schools
- vocational schools
- access to medical facilities
- highway access
- rail access
- airport access

D. Environmental Preview

- existing resources
- land use compatibility
- acoustic and visual impact

E. Social and Economic Considerations

- general statement on community services, population and labour force.

F. Pre-Conditions for Site Suitability

- areas for further investigation
- site development cost estimates

The overall summary tables which have been prepared for each of the three major petroleum activities:

Supply/Service Base
Steel Platform Construction
Concrete Platform Construction

show which sites should be given preferred status. However, without applying weights to the various factors it is impossible to rank each of these sites.

PRELIMINARY EVALUATION
ARGENTIA
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE

b) STEEL PLATFORM CONSTRUCTION

c) MODULE FABRICATION AND ASSEMBLY

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: ARGENTIA

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	500 A	Available	
- waveheight (3 ft.)			
- cargo wharf 33' draft (500 ft.)	2300'	Need repairs, dredging	
- supply wharf 20' (900 ft.)	100'		
2. ADEQUATE DEPTH	usable	Need repairs	
- harbour depth (33 ft.)			
- channel depth (33 ft.)	42'	Available	
- channel width (800 ft.)	1000'	1560' with 25' depth	
- approach depth (33 ft.)	742'	Available	
- turning basin (1000 ft.)	2400'	Available	
3. FORESHORE AREA (20 A)	20 A	Available	
4. INDUSTRIAL AREA (200 A)	200 A	Available	
5. ICE FREE (5% interference)	100%free	Available	
6. PROXIMITY TO DEVELOPMENT	325		
7. TRANSPORT NETWORK			
- highway	inadequate	By-Pass for Dunville	5
- rail	yes	Service 3x per week	5
- air	St.John's	Airfield on base for private	2
B. SOCIAL AND ENVIRONMENTAL (ranked)			
8. EXISTING INFRASTRUCTURE	excess		
- schools	200-300		6
- vocational schools	on site	low ind. orient. Seal Cove, St. John's	10
- medical facilities	on site	Cottage Hospital	5
- housing	1200	unserviced - Placentia	9
- power supply		upgrading needed	7
- sewage disposal		system upgrading for site	5
- solid waste disposal		site required	0
9. WATER SUPPLY		work needed	5
10. QUALIFIED LABOUR			
- **construction**		5489 taxpayers	10
- **fabrication**		689 construction, 85 fabrication	
11. LAND USE COMPATIBILITY			9
- fishing		2 local inshore plants	8
- forestry		little industry	9
- agriculture		little industry	10
- salmon rivers			9
- wildlife			10
C. CAPITAL COST			

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: Argentia

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR	500A	Available	Critical
- cargo wharf 600' at 33'	50+	Available	
- dock 350' at 40'		Available	
- Buildup Pier 400' at 40'			
- Assembly Area		Attainable	
- Tow out min. 40'	42'	Available	
Harbour depth 115' - 130'	120'	Available	
- Waveheight less than 3'		Available	
2. FORESHORE AREA 20 ha (50 acres)		Available	
3. INDUSTRIAL AREA 60 ha (150 acres)		Attainable	
4. TRANSPORT NETWORK		Same as Supply/Service Base	
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR			
- total labour			
- unemployed skills			
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COST			

ARGENTIA

General Description

The port of Argentia is located on the south coast of Newfoundland on the east side of Placentia Bay, 35 miles north of Cape St. Mary. The site being considered is the "north side" of the U.S. Naval Station, which consists, basically, of the Argentia Peninsula. This portion of the base has been abandoned by the U.S. Navy, and was leased to the Government of Canada by an agreement signed in 1976. The Government of Canada sub-leased the area (excepting the waterfront to the Government of Newfoundland and Labrador, who now administer the property, subject to the terms of the agreement). The area of the north side is approximately 890 ha (2230 acres). The U.S. Naval Station at Argentia was constructed in 1941, and, under the terms of an agreement signed at that time,the site became the leasehold property of the U.S. Government for a period of 99 years. The present sub-lease agreement gives the U.S. Government re-entry rights in the event of a war or a perceived "National Emergency", or otherwise as may be mutually agreed upon between the U.S. and Canadian Governments, without right of compensation to developers in the event of re-entry.

Argentia is the Newfoundland terminal for the East Coast Ferry service, operated by C.N. Marine. This service presently operates from June to September, and is a direct passenger/ automobile service for North Sydney.

There are four towns in the immediate vicinity of the site with a combined population of 6,571 (1976) - Dunville, Freshwater, Placentia and Jerseyside. Argentia has been nominated for a number of developments related to offshore petroleum 1) supply/service base 2) steel platform constuction, and 3) module fabrication and assembly.

Description of Harbour, Foreshore and Hinterland

1.		Protected Harbour Area (headland to headland) 33 ft. min. draft	500 acres
2.		Protected Area (Entire Bay)	1900 acres
3.		Channel Depths	42 ft.
4.		Channel Widths (25 ft.)	1560 ft. (small obstruction
		(33 ft.)	1000 ft.
5.		Turning Basin (diameter at 33 ft.)	2400 ft.
6.		EXISTING WHARFAGE AND DOCKS:	
	A.	Fleet wharves, berths, A to J, Marginal wharf with 24-34 ft. water at LWOST, wooden pile construction with concrete and wood deck construction.	2,672 ft. docking face
	B.	Wharf at Low Room Point dept, 28 ft. @ LWOST (Refueling wharf) in very poor condition.	400 ft. docking face
	C.	Wharf SW of Low Room Point depth alongside 20 ft. @ LWOST in very poor condition.	254 ft. docking face
	D.	C.N. Wharf, depth alongside 25 ft.	416 ft. docking face

E. East Coast Ferry terminal dock for end-loading car/ passenger ships only.

NOTE: "Fleet Dock" is in various stages of repair. A 1978 study by Albery Pullerits and Dixon estimates repair cost at $231,000 ('82 $).

7. Ice Restricted Access

The port is ice free and is capable of year round operation.

8. Wave Restricted Access

The maximum recorded wave height is 4 ft. recorded over 72 year period.

9. Currents: Tidal only.

10. Tidal Variation

Tidal streams are weak and variable. Tidal range 6.8 ft.

11. Seabed Conditions

Rocky, mud and sand. Poor holding ground indicated.

12. Proximity to Drilling/Production Activity: 325 miles.

13. Land Availability - Foreshore

The foreshore is level and developed, but will require some repair both for streets and buildings. The available land is well in excess of 20 ha that is required.

14. Industrial Land Availability

There is a large quantity of level land on the north side of Argentia. Elsewhere the land could be classified as hilly. The industrial land available is well in excess of 80 ha.

15. Topography

The Argentia Peninsula consists of relatively flat level land sloping gently away from the waters edge. Soil conditions are mostly tills and clay and vegetation cover consists of grasses and shrubs.

Physical and Social Infrastructure

16. Water Supply

Argentia Naval Base is not self-contained regarding water supply. Their source (Larkins Pond) is shared with the Towns of Pacentia, Freshwater and Jerseyside. It is estimated that ½-1 mgd. of water will be required for the proposed developments. There are a number of problems associated with activating the existing water and sewer system (1979 Report by Project Management and Design) which would cost $350,000 (1982 $). In addition, the

U.S. Government has requested that the Province take over operation of the U.S. water supply and sell water to the U.S. They have requested that we twin the 12" water main from the water treatment plant to the north side of the Base at an estimated cost of $600,000. There appears to be sufficient potable water in the sub-region since South East River came on stream this year, as a supplement to the Placentia town supply.

17. Power Supply

It is estimated that steel platform construction will require 5 - 8 megawatts of power. While Argentia is already on the Provincial power grid some upgrading would be required.

18. Sewage Disposal

As the site is on the waters edge there should be no problem with disposal of sewage. Sewage generated by offshore rigs is commonly treated and disposed of at sea. Sewage from a supply base itself is estimated to be 200 tons per year. The volume and nature of waste water generated by such a development may require sewage treatment.

19. Solid Waste Disposal

A permanent base would most likely require a separate landfill site. Approximately 9 ha would be required. Sufficient land is available.

20. Housing

The number of new families moving into the area would depend more on the length and stability of the operation than its size. There is more than adequate excess residential land in the Argentia area. Placentia alone has in excess of 1200 building lots.

21. Schools

Assuming all three operations occur and 60% in-migration (1200 jobs) and 80% in-families, the additional population would generate a requirement for 28 elementary and 17 high school classrooms. There are presently five schools in the Placentia area with an excess capacity of between 200 - 300 students.

22. Vocational School

There is a vocational school in Placentia providing training in a variety of technical and trade skills. In addition there are four other schools within an 80 mile radius.

23. Access to Medical Facilities

There is one 35 bed cottage hospital located in Placentia. Patients requiring additional care are moved to St. John's.

24. Highway Access

The site is served by the Argentia Access Road (30 miles to T.C.H.) which is a first class all weather paved highway. The development of a supply base or steel fabrication at Argentia would necessitate an immediate by-pass of Dunville on Route 180 at an estimated cost of $6.7 million (1980 $).

25. Rail Access

Since deactivation of the U.S. facilities many former rail lines, although still existing, have been disconnected from the CN Branch line to the north side of Argentia. CN still operates to its own facilities three times a week.

26. Airport Access

The nearest M.O.T. airport is St. John's (80 miles). There is an airport on the site belonging to the USN with runways approximately 7000 ft. x 200 ft., and also the remnants of a sea plane base.

Environmental Preview

27. Natural Environment

Argentia is an existing industrial site and as such little or no impact on the environment is anticipated. There are resources within the area, however. There are two salmon rivers which contribute approximately 1% of total salmon yield. There are no caribou or moose calving on wintering areas within 30 miles of the site. Information on seabirds is unavailable.

Forestry

In 1980 there were 31 sawmilling operations with an estimated total production of 730,000 fbm and an estimated employment of 25 manyears. No long range potential.

Fisheries

In 1980 there were 347 boats in the inshore fishery,694 fishermen (133 manyears with total landing of 32 million lbs. and a landed value of 5.2 million dollars). There are five (5) fish processing operations - Jerseyside, Argentia, Dildo and Gooseberry Cove employing 476 persons or 289 manyears.

Agriculture

The Argentia site is not in conflict with any agriculture development area. What agriculture there is is small and fragmented.

28. Acoustic Change: No impact expected.

29. Visual Aesthetics: No impact expected.

Social and Economic Considerations

30. Community Services

The four towns taken together with the Argentia area contain a fairly wide range of facilities. Some upgrading would be required in schools and medical facilities. The area has already experienced a boom and bust with the construction and operation of the Naval Base and its deactivation. New industry coming into the area would mean a return to a more familiar and accustomed prosperity.

31. Denographic Change

The area would experience between a 30 - 60% increase in population although this would not be considerably different from when the U.S. Base was in operation.

32. Labour Force Characteristics

The last complete labour force breakdown by occupation was in 1971. The Labour Force was 1600 which is similar to the population/labour force ratio of 4:1 for most rural areas.

For purposes of income tax filing and unemployment insurance benefits, the Argentia area comprises more than the four towns which we have previously discussed. In 1978 there were 5489 taxpayers, 36% of which were unemployed. In January, 1981, (month of maximum unemployment) there were 1986 receiving U.I.C. benefits of which 34.7% (689) were listed as construction workers, 4.3% (85) as machinery and fabrication and 27.6% processors. Labour supply is moderate in relation to labour demand.

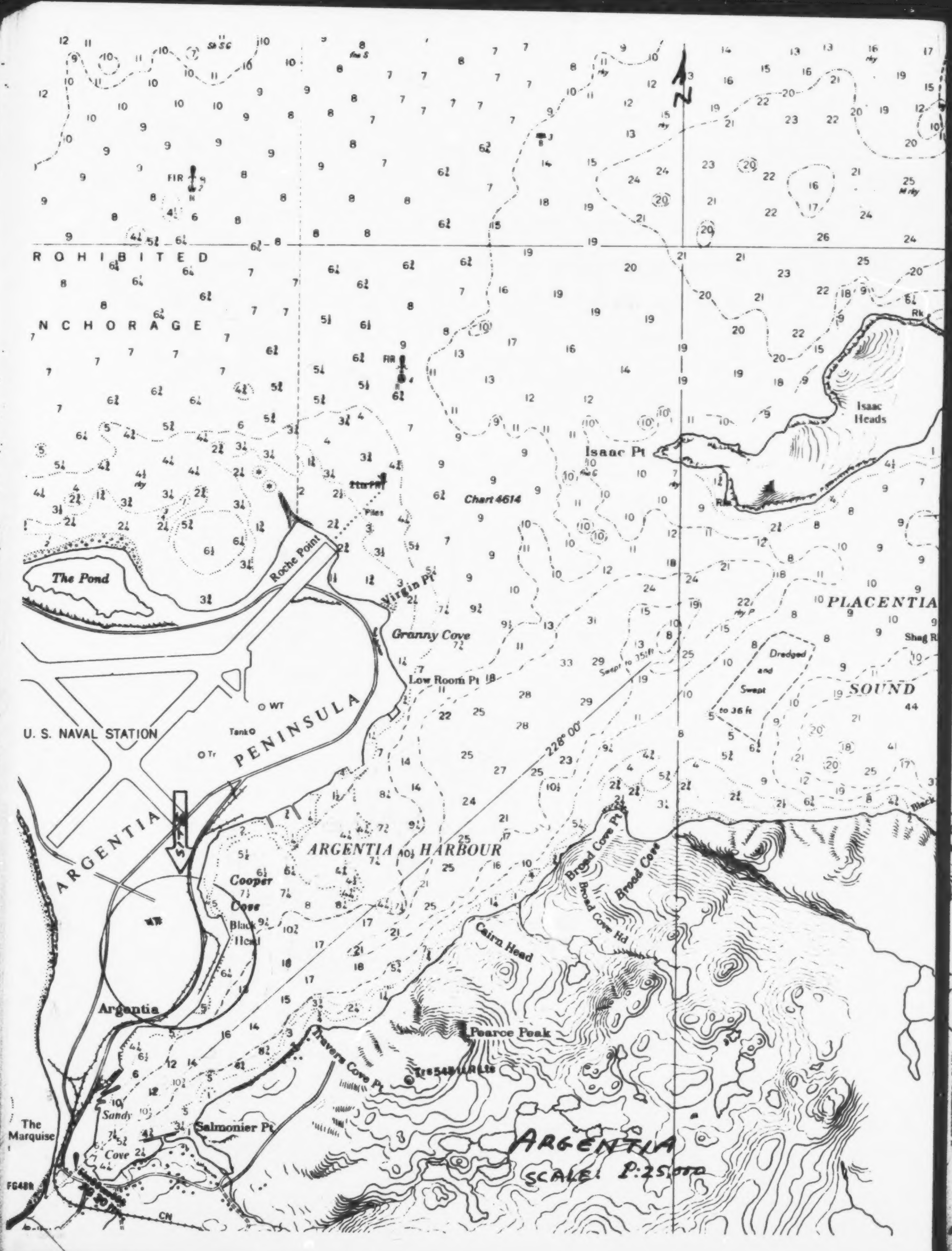
Pre-conditions for Site Suitability

33. Constraints

- Site itself is a former military base. Negiotation of re-entry clause required to make site suitable for investment.
- Dunville by-pass will have to be constructed at a cost of $6.7 million.
- Additional water supply will be required if large industry materializes. Upgrading of existing services estimated at $950,000. Some recovery on this through sale of water to U.S.N.
- Emphasis will have to be put on training to meet labour demand requirements of offshore oil.
- Municipal upgrading package required to go hand in hand with the developers industrial package.
- The various municipalities should be integrated for control of development.
- Land fill for solid waste disposal required.
- Repair to Fleet dock - $231,000 minimum.

34. On Site Development Costs:

- highway development	$ 6,700,000
- industrial land	900,000
- harbour facilities	670,000
	$ 8,270,000


ROHIBITED
NCHORAGE
The Pond
Roche Point
Virgin Pt
Granny Cove
Low Room Pt
Chart 4614
Piles
U. S. NAVAL STATION
WT
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PENINSULA
ARGENTIA
Argentia
Cooper Cove
Black Head
ARGENTIA HARBOUR
228° 00'
Isaac Pt
Isaac Heads
Rk
PLACENTIA
SOUND
Shag R
Dredged and Swept to 36 ft
Swept to 35 ft
Broad Cove Pt
Broad Cove
Broad Cove Hd
Cairn Head
Pearce Peak
Travers Cove Pt
Salmonier Pt
Sandy Cove
The Marquise
FG48R
CN
Black
FlR
N

ARGENTIA
SCALE: 1:25,000

PRELIMINARY EVALUATION
BAY BULLS AS A SITE FOR
PIPELINE LANDFALL

BAY BULLS

General Description

Bay Bulls lies on the east coast of the Avalon Peninsula some 25 km south of St. John's. The nearest communities to Bay Bulls are Witless Bay and Goulds, about 3 km to the south and 20 km to the north respectively. Bay Bulls is part of the St. John's Metropolitan Area and a Development Scheme for Bay Bulls and Witless Bay was adopted by the Metro Board in 1980. This scheme proposes small areas for industrial expansion of existing fish plants and wharf area (proposed federal marine centre), with the rest of the shoreline designated open space and rural. The industrial expansion areas relate to marine activities.

Bay Bulls has been nominated for a pipeline landfall. While it is technically feasible to design and lay a pipeline from the proposed Hibernia field development the economics and safety features associated with its operation are still in debate.

While the Bay Bulls Development Area covers the whole community of Bay Bulls the most likely location for a landfall would be on the southern shore of the Bay in the area of Maggoty Cove. Bay Bulls lies at the head of a narrow harbour and is situated on extremely undulating ground rising sharply from the sea in all directions. The community is restricted and there is very little suitable land for future growth.

Bay Bulls has a population of 1000 and a sub-regional population of 140,000 including St. John's.

The fish plant represents the major industry of the community and considerable farming takes place in the surrounding area.

Requirements of Pipeline Landfall

The requirements of a landfall terminal depend on whether the pipeline will terminate at a tank farm - transhipment point or be pumped further inland to a refinery point. Land requirements and associated infrastructure depend on the option taken.

The landfall site should allow for a flat approach or reasonably gentle transition from marine to land environment. The site should not be subject to erosion from seabed shifting or tidal action and there must be sufficient soil (sand or shingle) to provide a 7-10 foot cover over the pipeline. Excavation work to achieve the bury protection and slope change requirements must be feasible.

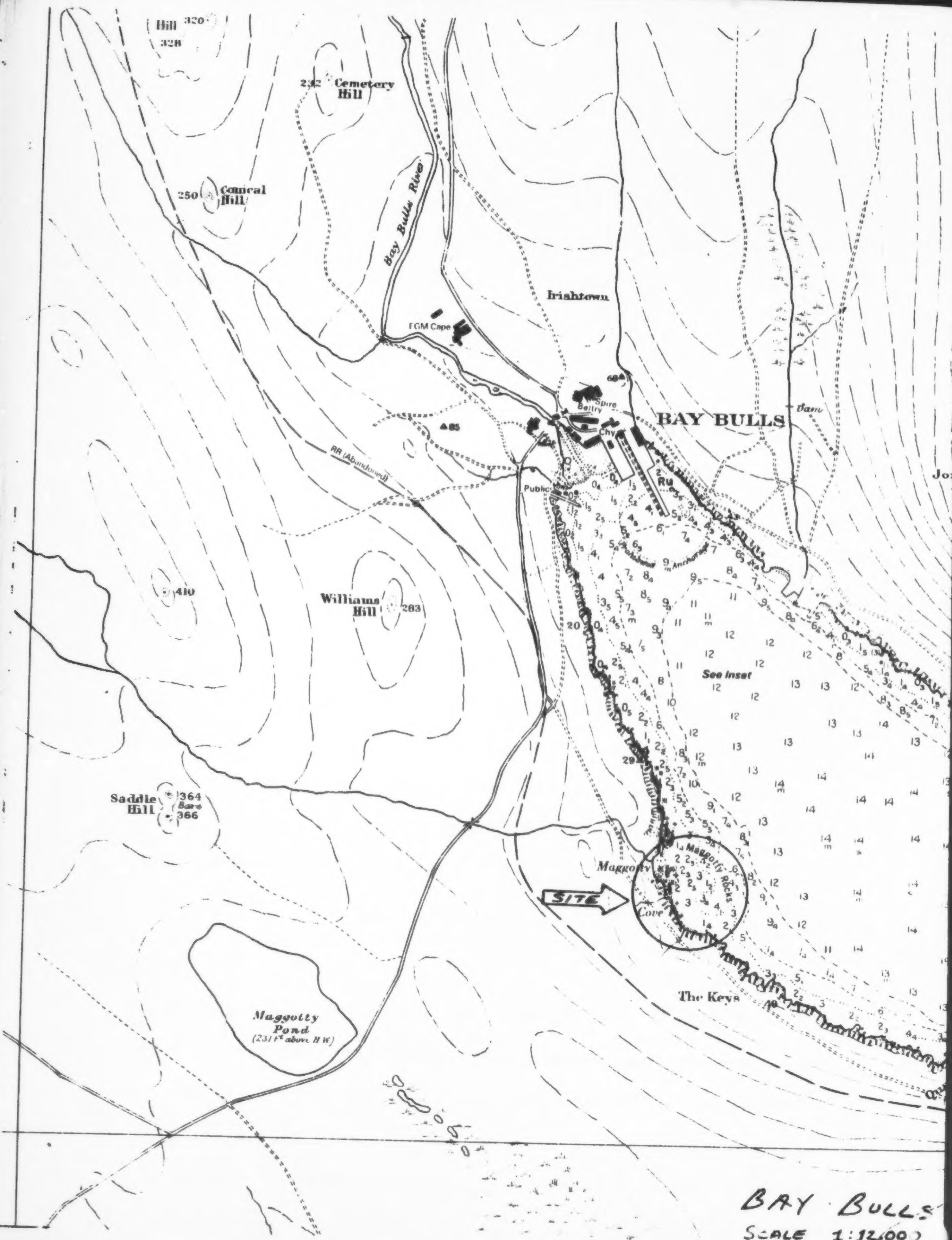
Approximately 40 acres of land (16 ha) would be required if the pipeline were to continue over land. This would be used for storage tanks, a pumpstation and office. If the site is to serve as a tank farm-transhipment point than a number of other facilities maybe required, i.e., separation facilities and partial processing facilities to remove gas and salt water;

ballast handling facilities and possibly flocculation equipment to reduce oil concentration in ballast water to acceptable levels. This would require an area of approximately 25-30 ha. (60-75 acres).

The nature of the selected development would have little impact on the physical and social infrastructure of the community as the work force is estimated at only 20-25 persons. Environmental impacts, in terms of possible water pollution, increase noise levels from compressors and pipeline venting and the visual impact of a tank farm on the ground should not be ignored.

Constraints Associated with Development

- Bay Bulls is severely exposed to the Atlantic Ocean from the southeast and is frequented by icebergs passing offshore.
- there is a scarcity of flat land in the community to meet the area requirement for the site.
- no piped water or sewage facilities available.
- industrial power supply to power pump would be required.
- a route for the shipment of product from Bay Bulls to final terminus must be determined.
- the impact on the fishery, the economic base of the community, must be assessed.
- possible environmental impacts, particularly the impact of the development in terms of water pollution could pose a serious problem.


Hill 320
328
232 Cemetery Hill
250 Conical Hill
Bay Bulls River
Irishtown
FGM Cape
60
Spire
Belfry
BAY BULLS
Dam
Chy
Ru
85
RR (Abandoned)
Public
Anchorage
410
Williams Hill 283
See Inset
Saddle Hill 364
Bare
366
Maggotty Rocks
Maggotty Cove
SITE
The Keys
Maggotty Pond
(231 ft above H.W.)

BAY BULLS
SCALE 1:12,000

PRELIMINARY EVALUATION
BAY ROBERTS - SPANIARD'S BAY
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

Location: BAY ROBERTS

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	85 A	protected only if breakwater built	
- waveheight (3 ft.)	13'	" " "	
- cargo wharf 33' draft (500 ft.)	-	required	
- supply wharf 20' (900 ft.)	-	required	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	36'	available	
- channel width (800 ft.)	-	little or none at 33'	
- approach depth (33 ft.)	33'	5400' wide	
- turning basin (1000 ft.)	1600'	much greater outside Green Head	
3. FORESHORE AREA (20 A)	160 A		
4. INDUSTRIAL AREA (200 A)	600 A		
5. ICE FREE (5% interference)	18 days	no constraint	
6. PROXIMITY TO DEVELOPMENT	250		2
7. TRANSPORT NETWORK			
- highway	yes	upgrading required	5
- rail	yes	little used,unlikely	
- air		alternative to road	5
	50 mi.	St. John's Airport	5
B. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE			
- schools (400 vac.)	300 vac		8
- vocational schools		Carbonear, Seal Cove	5
- medical facilities	full hospital	Carbonear	10
- housing (200 lots)		land banked,publicly owned lots	6
- power supply	available		10
- sewage disposal	town syst		10
- solid waste disposal (20 A)		need a 20 A landfill	0
9. WATER SUPPLY (25-50,000 gpd)	1.5 mgpd		supply 10
10. QUALIFIED LABOUR			
- **construction** (200)	11,900	total labour force	10
- **fabrication** (100)		329 fabrication, 298 transp.	10
11. LAND USE COMPATIBILITY			
- fishing		1293 fishermen, 1569 pros.	4
- forestry	52 manyrs.	no big growth potential	7
- agriculture (zoning?)	non-Ag.		10
- salmon rivers (on site?)	No		10
- wildlife (calving/wintering?)	No		10
C. CAPITAL COST			

BAY ROBERTS, SPANIARDS BAY

General Description

Bay Roberts is located on the Avalon Peninsula, approximately 100 km west of St. John's. The general topography at the Town of Bay Roberts is flat, especially the land north of the town facing adjacent Spaniards Bay (i.e., the proposed site for the offshore service base) and devoid of roads and houses. Bay Roberts, the bay itself, is approximately 7.0 km long and, more-or-less consistently 2.5 km wide. It is sheltered at the north and south by long, narrow peninsulas comprised of high cliffs at the outer end.

The Town of Bay Roberts is accessible from both the east and west via the T.C.H. The town is reached by travelling 70 km along T.C.H. to Route 70 (Conception Bay Highway) and then 21 km along this route to Bay Roberts.

The site chosen runs along the south shore of Spaniards Bay from the bottom of that bay, a distance of about 3 km in the easterly direction. The property varies in depth from 200 m to 600 m and contains 160 ha (400 acres) more or less.

Bay Roberts has a population of 4695 (1976 census) and lies within a region of population 37,405 for the whole of the Conception Bay North Shore (Brigus to Carbonear). In addition the western, Trinity Bay, shore of the peninsula had a population of around 10,000 and the adjacent St. John's urban region a population of over 140,000.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland) min. 33 ft. draft	85 acres
2.	Protected Area (Entire Bay)	1945 acres
3.	Channel Depths	36 ft. possible
	Harbour Depth	30 ft.
4.	Channel Widths (25 ft.)	0
	(33 ft.)	0
	Approach Entrance (33 ft.)	5400 ft.
5.	Turning Basin (diameter at 33 ft.)	1600 ft.

6. Existing Wharfage and Docks - no leased private wharves available.

   - small government wharf on both sides of the bay and five shallow draft fishermen's wharves on the north shore.

   - on south shore of harbour commercial wharf to accommodate ships up to 500 ft. and 30 ft. draft owned by Avalon Coal.

7. Ice Restricted Access

Ice may occur in Conception Bay between mid January and March and clear between mid March to April 20. Duration of ice presence is normally short. Based on statistics for the period 1960-1980 the mean annual duration of ice of 1/10 or greater concentration in the approaches to Conception Bay is 18 days. Most of the supply vessels now operating are ice strengthened and would be able to navigate 90% of the days with ice concentration of 1/10 or greater though time required for trip would be lengthened considerably. In Conception Bay, dense draft ice can occur if there is a general trend for the pack ice to remain close to shore. (NNE prevailing winds). These conditions may require an ice breaker to allow for ship passage.

8. Wave Restricted Access

The height of waves at the entrance to Spaniards Bay is 5.5 m (18 ft.). This height of waves is unchanged throughout the bay until it reaches Bear's Cove where it starts to dissipate but still reaches a level of 4 m (13 ft.). A breakwater would be imperative to protect the harbour area.

9. Wind Direction and Speed

Along the east coast of Newfoundland westerly winds prevail with shifts in direction due to storms or low pressure ridges. Gale force winds (57.5 to 101 km/hr) occur 5 to 6% of the time with a high of 10 - 16% in winter and a low of 1% in spring and summer.

10. Fog

Fog occurs during May, June and July. Sea fog type as opposed to an inshore fog. Offshore winds aid in maintaining better visibility inshore, particularly along the east coast of Newfoundland.

11. Currents

Geographical and tidal conditions in Spaniards Bay are not conducive to the creation of littoral currents. There are no rivers of any importance flowing into the bay susceptible of creating local current.

12. Tidal Variation

Tides have an amplitude of 1.4 (4.6 ft.). Tides of such low amplitude would not hinder the docking and loading of tugs and offshore service vessels.

13. Seabed Conditions (Geotechnics)

Silt, sand, gravel, sandy silt containing organic material overlying very dense sand and gravel. Soil conditions to above elevation 14 m are not suitable for support of gravity concrete cribs. Dredging would be required to remove all this material.

14. Proximity to Drilling/Production Activity: - 250 miles.

15. Land Availability Foreshore

Most of the land in site area is relatively flat or rises gently (6%) from the shore at Bear's Cove to Central Street. Foreshore contains 10.5 ha (26.3 acres).

16. Industrial Land Availability

Proposal indicates development of 400 acres of land adjacent to the port area.

17. Topography (surficial geology)

This area is covered by only a thin deposit of till, although there are some drumlinoid features with greater thickness. There are no significant gravel deposits within the area. Probably stable subsoils.

Physical and Social Infrastructure

18. Water Supply

Bay Roberts is supplied with fresh water from a lake called Rocky Pond located 6.5 km from the town. Rocky Pond serves as the water supply for Bay Roberts, Spaniards Bay and Upper Island Cove. The system was designed to service a total population of 51,000 and the watershed is capable of development into a 1.5 mgd water supply with regulation of upstream ponds.

19. Power Supply

The power supply in the area controlled by Newfoundland Light and Power. Installed capacity 66 kV.

20. Sewage Disposal

The sanitary sewage system in Bay Roberts has been designed to serve a population of 15,000 people. Since site is on waterfront location there should be no problem with disposal of sewage. Depending however on the volume and nature of waste water generated by the offshore operation, sewage treatment may be required at base.

21. Solid Waste Disposal

A permanent base would most likely require a separate landfill site. Approximately 9 ha would be required.

22. Housing

The number of new families moving into the area would depend more on the length and stability of the operation than on its size. Within all the municipalities and settlements of the region there is considerable infill land available for residential development. As well a number of sites have been proposed for future residential development within the immediate vicinity of the development area. These are presently vacant and unserviced.

23. Schools

School enrollments indicate in a general way the size of existing facilities. There are four schools in Bay Roberts, Spaniards Bay with a total of 75 teachers and an enrollment of approximately 1500. There is additional capacity to accommodate 300 students.

24. Vocational Schools

There is a district vocational school at Carbonear and one in Seal Cove near Holyrood.

25. Access to Medical Facilities

There is a 100 bed full service hospital at Carbonear with 14 physicians on staff. Bay Roberts itself has 6 physicians, 3 Public Health nurses and an ambulance service.

26. Highway Access

The major link to T.C.H. is Route 66, Roaches Line. Road access to site is presently by way of the congested Conception Bay Highway (Route 70). Within the town the tertiary connecting roads are generally less than two lanes wide and in poor state of repair. The proposed Conception Bay North by-pass a $19.2 million project would have to be implemented to improve road access both for Harbour Grace and Bay Roberts, Spaniards Bay to enable the transport of heavy materials.

27. Rail Access

A C.N. rail branch line runs up the shore from Holyrood to Carbonear. The line is little used and is unlikely to provide an alternative transportation route for heavy materials.

28. Airport Access

The nearest airport is Torbay, St. John's, 100 km away.

Environmental Preview

29. Natural Environment

The area proposed for development is presently vacant. There are no on-site salmon rivers and wildlife re moose and caribou have no established calving or wintering grounds within a 36 mile radius of the site. Bay Roberts accounts for approximately 3 - 4% of total kill in this management zone. Terrestrial wildlife would not be directly effected by development on the shore or near shore areas.

Seabirds & Waterfowl

Seabirds are the most vulnerable of the natural species which could be affected by oil development. While there are a variety of seabirds and waterfowl in the Conception Bay area and all species use coastal regions for feeding purposes this area is not a sea bird sanctuary. Major damage would result only in the event of an oil spill.

Fisheries

In 1980 there were 751 boats in the inshore fishery in the Conception Bay Region from Brigus to Carbonear; 1293 fishermen (269 manyears) with a total landing of 85.2 million lbs., and a landed value of $9.9 million dollars in the Harbour Grace Area (Dildo to Carbonear) there are 11 fish processing operations employing 1567 persons or 1147 manyears. There are no fishing berths within a mile of site.

Agriculture

The Bay Roberts site is not in conflict with any agricultural development area.

Forestry

In 1980 there were 65 small sawmilling operations in the catchment area (30 miles) with an estimated 1,555,000 fbm and an estimated employment of 52 manyears. No long range potential.

Recreation

No conflict between recreational use and proposed site.

Impacts on the fishery and other resources due to port construction in Spaniards Bay are likely to be minimal.

30. Acoustic Change: - Minimal impact.

31. Visual Aesthetics: - Minimal impact.

Social and Economic Considerations

32. Community Services

As the proposed site lies within easy commuting distance of a variety of communities access to a wide range of facilities is available. The strain on existing facilities will depend on the degree of in-migration associated with the proposed development.

33. Demographic Change

Given the fairly large population base in the Conception Bay North Shore region (37,405) it is anticipated that only a moderate change in population will occur and that the effect will be spread amongst a number of communities.

34. Labour Force Characteristics

The 1976 Labour Force activity in the region indicates a large male labour force at the time of 8,040 and a female labour force of 3,86[illegible]5 with an unemployed male rate of 21% and female unemployed rate of 25.1%. There is no breakdwon by occupation.

In 1978, the number of taxpayers in the Conception Bay

North Shore region were 14,372 with an average income of $10,209.

In order to get some indication of the skills of the unemployed in the region, unemployment insurance figures for January, 1981, were used. The skills of most interest for service base operations are general labourers and marine related occupations. Without regional information on the pool of these skills, both employed and unemployed,it is impossible to estimate the labour force resident in the region who would be available for employment at the site and therefore what the potential in-migration might be. However, for purposes of this preliminary assessment the unemployed at present were used. Of the 6,850 unemployed, 34.5% (2363) were listed as construction workers; 4.7% (329) as machinery and fabrication 4.5% (298) as transport equipment and material handling, 27.1% (1,834) as processing and the remainder split amongst the remaining occupations. From this information it would appear that there is a sizeable labour supply to meet the labour demands associated with the proposed development.

PRE-CONDITIONS FOR SITE SUITABILITY

35. Constraints

- access to site off Central Street or Cross Road will have to be designed to minimize negative impacts of traffic on adjacent residential areas.

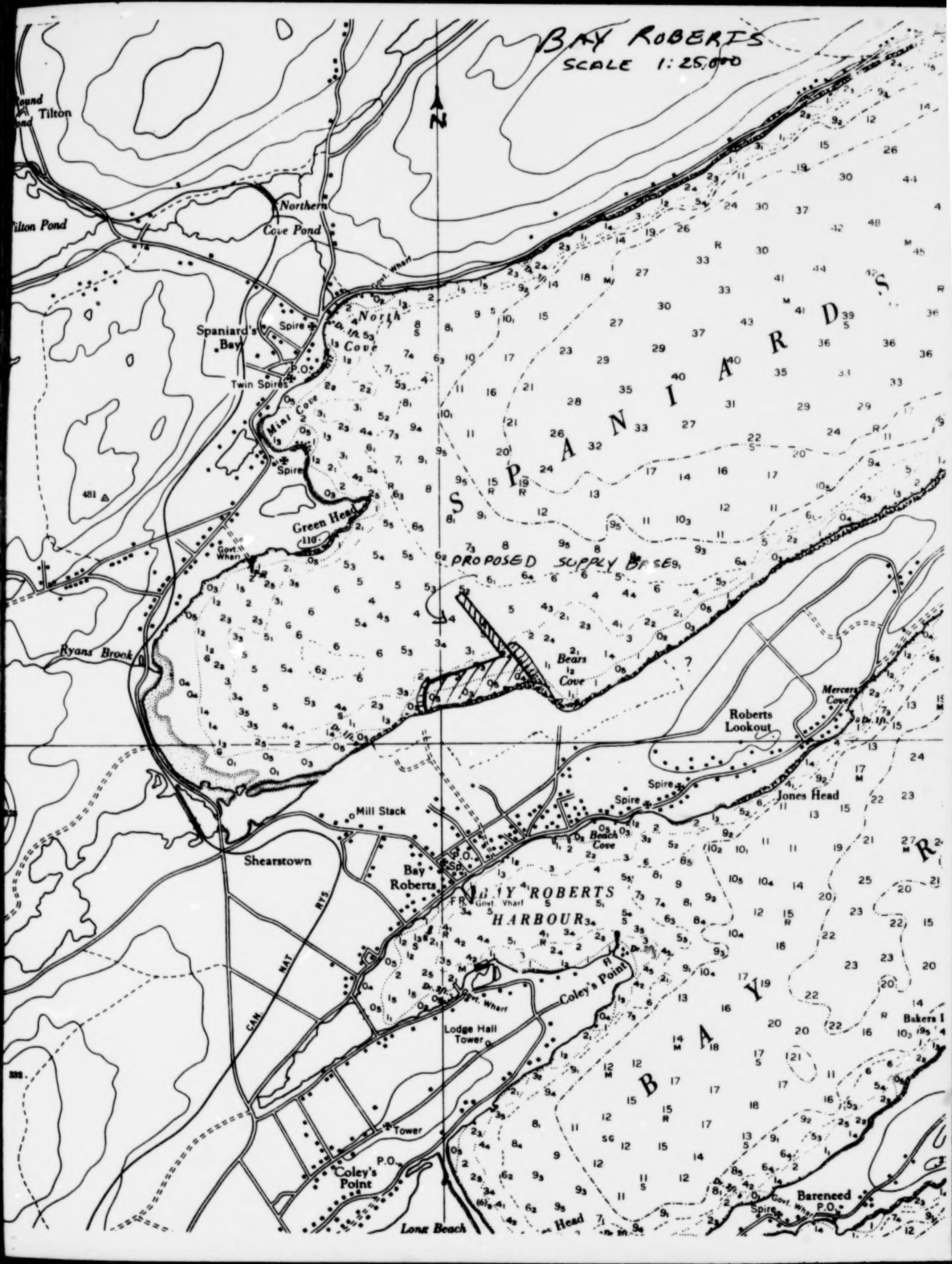
- uses/development proposed for Spaniards Bay waterfront reservation and their impact on adjacent community to be determined.
- municipal upgrading package required to go hand in hand with developers industrial package.
- Existing municipal jurisdiction is limited to use zoning guidelines for control over development standards and project operating procedures required.
- Conception Bay North By-Pass will have to be implemented as existing transportation routes inadequate to meet supply and traffic volumes. Estimated cost $19.6 million dollars.
- regional survey of existing capacity of "Hand Services" as well as social services required to pinpoint public facilities which would be put under strain by additional or rapid population growth.

On Site Develpment Costs.

- industrial water system	$ 1,600,000
- highway upgrading (Conception Bay North By-Pass)	19,200,000
- Breakwater	1,300,000
- Wharf	9,000,000
- Wharf	15,000,000
- Dredging	1,100,000
Total	$47,200,000

The cost to construct local, social, internal and industrial facilities will be extra.

BAY ROBERTS
SCALE 1:25,000


N
Round Pond
Tilton
Tilton Pond
Northern Cove Pond
Govt. Wharf
Spaniard's Bay
Spire
North Cove
P.O.
Twin Spires
Mint Cove
Spire
481
Green Head
110
Govt. Wharf
SPANIARDS
PROPOSED SUPPLY BASE
Ryans Brook
Bears Cove
Roberts Lookout
Mercers Cove
Spire
Spire
Jones Head
Beach Cove
Mill Stack
Shearstown
P.O.
Bay Roberts
BAY ROBERTS HARBOUR
Govt. Wharf
CAN. NAT. RYS.
Govt. Wharf
Coley's Point
Lodge Hall Tower
Tower
P.O.
Coley's Point
Long Beach
Head
BAY
Bakers I
Bareneed P.O.
Spire
Govt. Wharf

PRELIMINARY EVALUATION
BOTWOOD
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE
b) STEEL PLATFORM CONSTRUCTION
c) MODULE FABRICATION AND ASSEMBLY

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: BOTWOOD

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	1900+ A	160' deep	
- waveheight (3 ft.)	3	available	
- cargo wharf 33' draft (500 ft.)	3000'	available	
- supply wharf 20' (900 ft.)		available	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	130'	available	
- channel width (800 ft.)	2250'	available	
- approach depth (33 ft.)	7900'wide	available	
- turning basin (1000 ft.)	5400'	available	
3. FORESHORE AREA (20 A)	25 A	fully services	
4. INDUSTRIAL AREA (200 A)	260 A	more is zoned	
5. ICE FREE (5% interference)		may need icebreaker support	
6. PROXIMITY TO DEVELOPMENT	425	nearer Hibernia than Lab.	7
7. TRANSPORT NETWORK			
- highway		upgrading at site	9
- rail		private line needs work	5
- air		nearest Gander	4
B. SOCIAL AND ENVIRONMENTAL (ranked)			
8. EXISTING INFRASTRUCTURE			
- schools (200)	200+		5
- vocational schools	none	Grand Falls, Gander	10
- medical facilities	cot. hosp	Grand Falls Hospital	10
- housing (200 lots)	63 A	infill & zoned dev.easytoser.	10
- power supply		immediate response possible	7
- sewage disposal		may need system on site	5
- solid waste disposal		would need site	0
9. WATER SUPPLY		needs upgrading	5
10. QUALIFIED LABOUR			
- **construction** (200)	2272 taxpy.	5365 in labour force	10
- **fabrication** (100)		1250 const., 144 fabrication	10
11. LAND USE COMPATIBILITY			
- fishing		977 fishermen,85 processing	8
- forestry		10% of provincial lumber	5
- agriculture			10
- salmon rivers		three main rivers	2
- wildlife			10
C. CAPITAL COST			

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: Botwood

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR			
- cargo wharf 600' at 33'	Large		Suitabl
- dock 350' at 40'	50+'		"
- Buildup Pier 400' at 40'	60'		"
- Assembly Area		At least mimimum	"
- Tow out min. 40'	180'	minimum with 2500'	"
Harbour depth 115' - 130'	280'	minimum with 2500'	"
- Waveheight less than 3'	<3		"
2. FORESHORE AREA 20 ha (50 acres)	25 A		5
3. INDUSTRIAL AREA 60 ha (150 acres)	260A		10
4. TRANSPORT NETWORK		Same as Supply and Service	
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR			
- total labour			
- unemployed skills			
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COST			

BOTWOOD

General Description

The Town of Botwood is situated at the head of the Bay of Exploits in Notre Dame Bay on the east coast of Newfoundland. It is approximately 20 km from the T.C.H. at Bishops Falls and approximately 37 km from the regional centre of Grand Falls, Windsor, and is situated 80 km from Gander International Airport. The site which has been potentially designated for supply/service base, steel platform fabrication and module fabrication and assembly really comprises three parts - a waterfront strip and two portions of land immediately southeast of the town proper along route 350, the Botwood by-pass. The gross site area is 106 ha (260 acres) and is situated 3 km from foreshore area.

The Botwood area population in 1976 was 8,348 with over 50% concentrated in Botwood (4,554). It serves as a shipping port for Abitibi Price and Montreal Shipping on a year round basis. Botwood has previously been used as a temporary supply base for offshore petroleum by Chevron and British Petroleum.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area (headland to headland) min. 33 ft. draft	1900+ acres
2. Protected Area (Entire Bay)	10,000+ acres

3.	Channel Depth	130 ft.
	Harbour Depth	160+ ft.
4.	Channel Widths (33 ft.)	2250 ft.
	Approach Entrance (33 ft.)	7900 ft.
5.	Turning Basin (diameter at 33 ft.)	5400 ft.

6. Existing Wharfage and Docks:

There exists over 900 metres (3000 ft.) of berthing facilities at present and the harbour has the capability of being upgraded and expanded to accommodate many other vessels without interference or disruption to the Town or existing facilities. Availability and capacity of existing harbour facilities for oil related development is unknown.

7. Ice Restricted Access:

Two kinds of ice are encountered on the east coast of Newfoundland - icebergs and frozen sea ice which forms in the coastal waters from Fogo Island northward and is carried down the coast by wind and current. Both types have an important effect on navigation. Sea ice usually reaches Notre Dame Bay by late January. The intent and frequency of ice cover however depends very much on the prevailing winds in any particular winter. Ice begins to retreat in late March and has usually retreated to southern Labrador waters by late May. In years when north and NE winds are prevalent the pack ice remains close inshore. The port has been closed only 42 days in a twenty-two year period 1956-1980 which indicates feasibility in using the port on a year round basis with ice breaker support. On average, ice of 1/10 or greater concentration blocks the entrance to Notre Dame Bay for 100 days per year. Landfast ice which forms in December in sheltered areas of the bay stays till late April but is normally not in excess of 50 cm in thickness.

8. Wave Restricted Access:

The site is well protected and because the harbour is deep with very short fetch distances there are no adverse conditions associated with winds and waves from any direction in Botwood Harbour. Occasionally there may be winds of such magnitude to hamper vessel movement.

9. Wind Direction and Speed:

Westerly winds usually prevail, but frequent shifts occur during the passage of depressions or storms. In general, to the eastward of Newfoundland the most common direction, apart from the prevalent SW to NW direction, is South, followed in frequency by North and SE. Average wind speeds in summer are 12 - 14 knots and in winter 22 - 25 knots. In general winds in Botwood Harbour blow either in the bay or out the bay depending on local depressions or highs.

10. Fog:

Generally fog is not a problem along the east coast of Newfoundland. Offshore winds usually keep fog over the open sea area rather than inshore.

11. Currents:

Geographical and tidal conditions in Botwood Harbour are not conducive to the creation of littoral currents.

12. Tidal Variations:

The tide along the east coast is mixed but mainly semi-diurnal. Tides have an amplitude of 1.4 m (4.7 ft.) and would not hinder the docking and loading of tugs and offshore service vessels.

13. Seabed Conditions:

Silt, gravel and sand layers with some clay pockets.

14. Proximity to Drilling/Production Activity: - 425 miles.

15. Land Availability Foreshore:

Approximately 10 ha (25 acres) of foreshore industrial land is available alongside existing docking facilities. This land is fully serviced with power lines, fuel lines and fire protection.

16. Industrial Land Availability:

There is approximately 105 ha (260 acres) of zoned industrial land available and at least another 200 hectares (500 acres) could be made available adjacent to the zoned area.

17. Topography:

The topography of Botwood consists basically of a crescent-shaped strip of land varying in width from 150 metres (500 ft.) in the south to 800 m (2600 ft.) in the northwest. This area is covered mostly by sand and gravel possibly up to 8 - 10 m thick. It is estimated that over 1,500,000 m^3 of sand, gravel and boulders is available in the immediate area for use as backfill and bedding. No problems recorded in terms of foundations characteristics, bearing capacity failure, or settlement and drainage problems.

Physical and Social Infrastructure

18. Water Supply:

The Town's 250 mm (10") water transmission main from Peter's Pond to storage reservoir (51.2 m elev., 1365 m^3 capacity) and storage tank (69.8 m, 270 m^3 capacity) passes through the eastern portion of the Development area. Various improvements to water intake, pumps, and distribution system are required to provide for industrial fire flow requirements.

19. Power Supply:

Available power supply in area is fully utilized but additional capacity could be provided almost immediately.

20. Sewage Disposal:

The Town has a sewage system but not treatment facilities with 75% of the area serviced. Population design capacity is unknown. Since site is on waterfront location there should be no problem but treatment may be required to meet environmental standards.

21. Solid Waste Disposal:

A permanent base would most likely require a separate landfill site. Existing landfill site has a 20 - 30 year capacity for present population.

22. Housing:

The number of new families moving into the area would depend on the length and stability of the operation than on its size. Botwood has set aside two areas for residential development amounting to around 25 ha (63 acres). Additional land is available for infill housing. Both the undeveloped blocks and infill sites are adjacent to municipal services.

23. Schools:

School enrollments indicate in a general way the size of existing families. There are presently six schools in Botwood with a total of 67 teachers and an enrollment of approximately 1500 students. All are under utilized at present and an additional capacity of 200 students. The planned construction of a Roman Catholic School in Botwood will add additional capacity which should meet growth requirements for some time to come.

24. Vocational Schools:

There are no vocational schools in the Botwood area. The nearest schools are located at Grand Falls (20 miles) and Gander (57 miles).

25. Access to Medical Facilities:

There is a cottage hospital in Botwood with a 53 bed capacity, seven physicians and two public health nurses. The nearest regional hospital is located at Grand Falls (20 miles). Ambulance service is available.

26. Highway Access:

The proposed development site is well served by roads in the immediate area, being bisected by route 350 (Botwood By-pass). However, road connections between site and wharf facilities in Botwood harbour are presently inadquate for the type of development proposed as local routes and intersections are located in a relatively congested area.

27. Rail Access:

The Grand Falls Central railway line bounds the southwestern portion of the Development Area on the east. The line is owned by Abitibi Price and joins the main CNR line at Grand Falls (20 miles). The line is presently not being used and reactivation of the land would require new track and roadbed repairs.

28. Airport Access:

The nearest airport is Gander International, 57 miles east.

Environmental Preview

29. Natural Environment

The existing faciltiies in Botwood have created no environmental problems to date and since any onshore development will be most likely better engineered,adverse effects should be minimal. Any expansion in foreshore facilities will most likely have only a short term construction impact and the zoned industrial areas are scrub vegetation and barren land with no aesthetic value and provides little in the way of a habitat for wildlife.

Wildlife:

Terrestrial wildlife is minimal and should not be directly affected by development. Seabirds are common but it is not anticipated that the development will affect them. There are no seabird sanctuaries. There are no moose or caribou wintering or calving grounds in a 36 square mile management zone and Botwood accounts for only 2% - 5% of total area kill.

Salmon Rivers:

There are three salmon rivers in the area - Peter's River, Exploits River and Northern Brook accounting for approximately 6-7% of total yearly take.

Forestry:

In 1980 there were 48 sawmilling operations in the catchment area (30 mile radius) with an estimated 3,423,000 fbm and an estimated employment of 114 manyears. This accounts for 10-12% of total production of fbm for the Province. No high priority forest resource in immediate vicinity of site.

Agriculture:

Moderate potential for agriculture in the area. Botwood is included in Unit 7 (Brown's Arm to Comfort Cove) and has been designated as a medium priority area. The area is given this status mainly due to local development initiative, local markets, and/or conflicting land use pressure. There are four farms in Botwood.

Fisheries:

In 1980 there were 575 inshore boats operating in the Botwood area, 977 fishermen (148 manyears) with a total landing of 9.9 million lbs. and a landed value of 1.4 million dollars. There are two processing operations employing 85 people (70 manyears). The majority of the fishing activity is centered around Lewisporte.

Recreation:

No conflict between recreation use and proposed sites.

30. Acoustic Change:

Some increase in noise will arise from construction and would only be temporary. However if all three developments occur in Botwood noise levels could increase substantially.

31. Visual Aesthetics:

Not effected by potential developments.

Generally short term impact but no major conflict with competing resources.

Social and Economic Considerations

32. Community Services:

The proposed site lies within easy commuting distance of a major regional centre, Grand Falls (20 miles) as well as a variety of other communities. As such it has access to a wide range of services. The strain on existing facilities will depend on the degree of in-migration associated with the proposed developments.

33. Demographic Change:

Botwood Area population 1976 (including Peterview, Botwood, Northern Arm, Point Leamington, Notre Dame Centre and Leading Tickles West) was 8,348. Depending on the scale of operations and the number of commuters which might come from the Grand Falls - Windsor area population change could range from moderate to high.

34. Labour Force Characteristics:

In 1976 the labour force activity in the region was high for the male labour force 62.7% participation - total 1,715 of 2,735 and very low for the female force 22.8% participation, total 600 of 2,630. Overall participation was 43.2% or 2,315 of 5,365 in the labour force.

In 1978 the number of taxpayers in the Botwood area were 2,272 and for the whole Bay of Exploits area 11,538.

In order to get some indication of the skills of the unemployed in the region, unemployment figures were used for

January, 1981. These figures are given on a regional basis and covers an area from Norris Point to Leading Tickles to Embree. The skills required for service base operations are mostly general labourers and marine related skills while steel platform construction concentrates on certain construction trades particularly welders and metal-working trades. Without regional information on the pool of these skills, both employed and unemployed, it is impossible to estimate the labour force resident in the region who would be available for employment and therefore what the potential in-migration might be. However, an assessment of the unemployed in the area gives a general indication of labour force supply and has been used for this exercise. Of the 3,342 listed as unemployed, 37.4% (1250) were construction workers; 4.3% (144) machinery and fabrication; 9.4% (319) as transport equipment and handling and the remainder split amongst the remaining occupations. From this information it would appear that there is a sizeable labour supply to meet demands of a service base operation but a smaller skilled labour force to meet the requirement for steel platform construction and module fabrication.

Pre-Conditions for Site Availability

35. Constraints:

- Upgrading access to existing wharf and harbour facilities or construction of new access roads.

- municipal upgarding package to go hand in hand with developers industrial package.
- actual availability and capacity of existing harbour facilities which can be used for oil related development to be determined.
- the possible overlap of the protected watershed area and the development area will need to be resolved with a definition of the actual watershed and appropriate servicing policies for that part of the area.

36. Site Development Costs

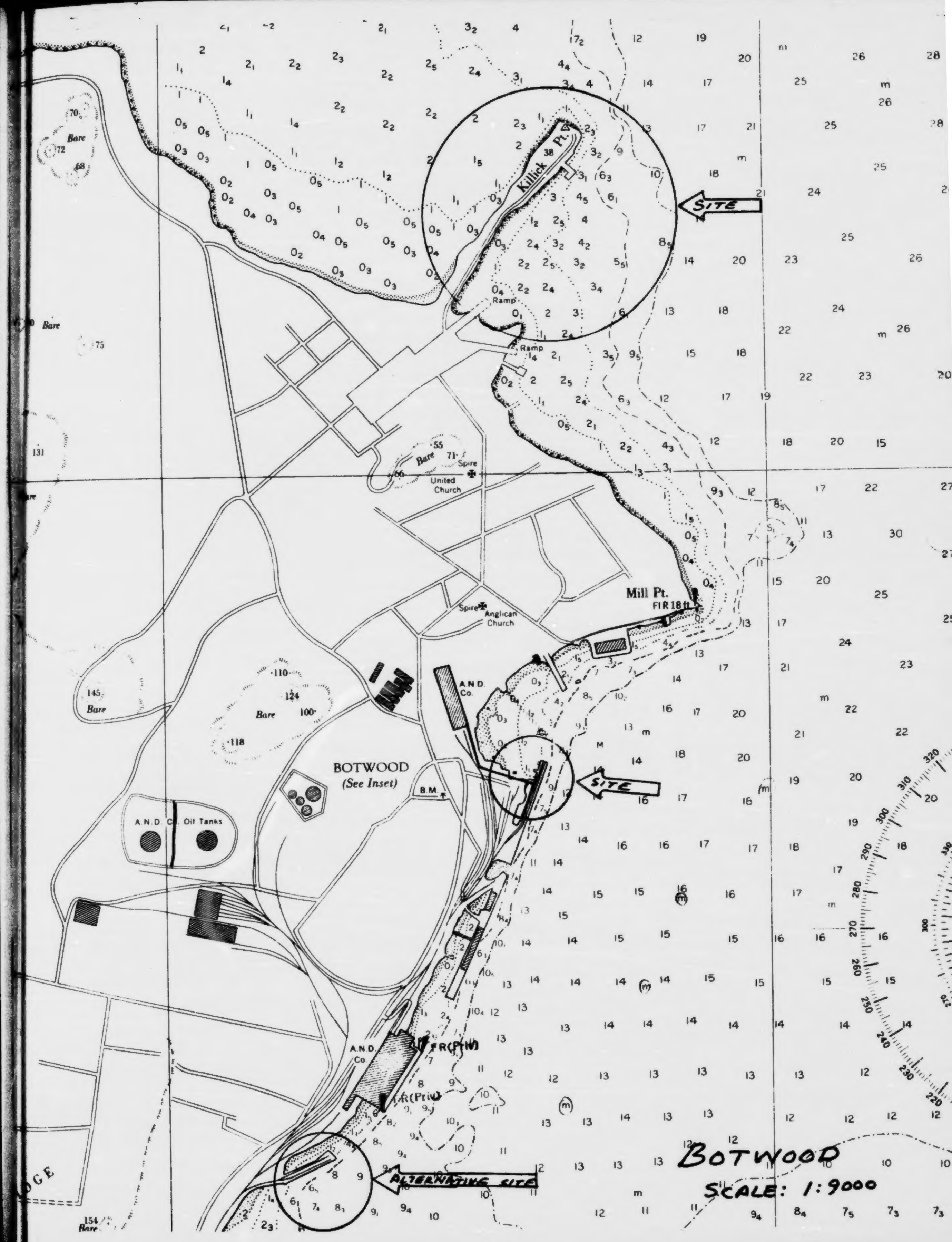
A. Supply/Service Base

Docks, water supply and major access roads are deemed suitable for this type of development. Capital costs are mainly attributed to local road and internal service upgrading.

B. Steel Platform Construction

Wharf	$ 2,100,000
Dredging	50,000
Contingencies	100,000
Total	$ 2,250,000

Additional cost of constructing onshore facilities are unknown.


Killick Pt.
38
SITE
Ramp
Ramp
Bare
Bare
Bare
Bare
Bare
Spire
United Church
Spire
Anglican Church
Mill Pt.
FI R 18ft
A.N.D. Co.
BOTWOOD
(See Inset)
B.M.
A.N.D. Co. Oil Tanks
SITE
A.N.D. Co.
F.R(Priv)
F.R(Priv)
ALTERNATING SITE

BOTWOOD
SCALE: 1:9000

PRELIMINARY EVALUATION
BULL ARM/SUNNYSIDE
AS A LOCATION FOR

a) CONCRETE PLATFORM CONSTRUCTION

b) STEEL PLATFORM CONSTRUCTION

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: BULL ARM/SUNNYSIDE

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR			
- cargo wharf 600' at 33'	1600A	Attainable	
- dock 350' at 40'	50+'	Attainable	
- Buildup Pier 400' at 40'	50+'	Attainable	Critical
- Assembly Area 400 @ 120'	400+'	Attainable	
- Tow out min. 40'	200'	Available	
Harbour depth 115' - 130'	600'	3000' wide	
- Waveheight less than 3'	< 3'		
2. FORESHORE AREA 20 ha (50 acres)	50A	Available	10
3. INDUSTRIAL AREA 200	100	Attainable	3
4. TRANSPORT NETWORK			
- highway		access road required	8
- rail		would rqr.spur&bridge	0
- air		nearest St. John's	5
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools	90		2
- vocational schools		Clarenville school	3
- medical facilities		new Clar. hosp.planned	5
- housing		servied land av.	4
- power supply		main trans.lines close	10
- sewage disposal		would be needed	0
- solid waste disposal		would be needed	0
2. WATER SUPPLY		no established supply	10
3. QUALIFIED LABOUR		low relative to prop.	
- construction 350		demand	10
- fabrication 700		707 const.,101 fab.	1
4. LAND USE COMPATIBILITY			
- fishing		1056 fishermen,440 pro	8
- forestry		little potential ind.	8
- agriculture		" " "	10
- salmon rivers		1 S. river in C.By C.	10
- wildlife		no wintering or calving	9
C. CAPITAL COST			

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: BULL ARM/SUNNYSIDE

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- cargo wharf 500' at 33'		suitable	
- Dock 650'X650' at 33'		suitable	
channel width 800'		suitable	
- Buildup Site 800' at 260'		suitable	
- Tow-out Base			
min depth 425', min width 200'		suitable/2800'@450'	
- Wave height, 3'	>3'for5%	may not be problem	
- Deep Sink Site 800' wide @660'		suitable	
2. FORESHORE AREA (50 A)			
3. INDUSTRIAL AREA (150A)			
4. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL		Same as for Steel Platform	
1. EXISTING INFRASTRUCTURE			
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR			
- construction (700)	707		10
- fabrication (350)	101		1
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COSTS			

BULL ARM

Bull Arm is located on the west side of Trinity Bay, at the northern extremity of the Isthmus of Avalon. The Town of Sunnyside, with a population of 726 in 1976, is located on the northern side of Bull Arm. The site is approximately 90 km from St. John's via the Trans Canada Highway, and is located about 1 mi off the T.C.H.

Bull Arm forms part of a region, which, for planning purposes, includes the area extending from Clarenville to the north to Long Harbour towards the south. The combined regional population was 16,690 in 1976. All towns and villages in the region are located within 40 miles of Bull Arm.

The harbour known as Bull Arm is approximately 10 miles in length, with an average width of ½ mile. It is an extremely deep harbour, with water depths of 120 feet occurring near the proposed development site, and depths of 500-600 feet being found in the outer portions of the harbour.

Bull Arm was designated as a potential site for steel platform fabrication in the initial presentation of October, 1980. Subsequently, the site was nominated for concrete platform construction by the private sector. A preliminary analysis of the site, measured against the physical and environmental criteria that have been used, reveals that the site is suitable for either activity. Onshore site development costs are apt to be high in view of the somewhat rough terrain that lies behind the foreshore on the south side of Bull Arm.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	1400 acres
2.	Depths	
	(a) Approach Channel Depths	450 ft. (outer portion 600 ft.+)
	(b) Mating Area depths	120 ft.
	(c) Construction, fitting out wharf site	50 ft.- 90 ft.

(d) Tow out depths: - 200' min. from inner portion of bay
600' min. from outer portion of bay

3. Channel Widths: - from ¼ to ½ mile @ 200' depth
- approximately ¼ mile @ 600' depth (outer portion)

4. Turning Area (shipping @ 33' draft) - ½ mile dia.

5. Existing Wharfage:

A small fishermen's wharf is located at the head of the harbour, and is of no significance to any development.

6. Ice Restricted Access:

Bull Arm usually freezes over from January through March, and offshore pack ice, when easterly winds cause Trinity Bay to fill up, would impede access in March and April. These conditions, while not making Bull Arm inaccessible to normal shipping,would require that platform construction and delivery schedules reflect the necessity of moving the completed platform out of the bay between early May and mid December.

7. Wave Conditions:

The outer portion of Bull Arm is vulnerable to 10-15 foot waves generated by southeasterly to easterly winds. These waves are substantially reduced in height towards the inner portion of the harbour, and would not impede operating at the proposed site for steel platform fabrication. From available data, it is unlikely that wave conditions would affect concrete platform build-up operations in the outer portion of the harbour more than 5% of the time.

8. Wind Direction and Speed:

See wind rose in appendix. Although this rose was prepared using St. John's airport wind records, correlation carried out by Public Works Canada during the construction of the Oil Refinery wharf at Come By Chance revealed that the St. John's data was a reliable basis for design on the Isthmus of Avalon. It can safely be concluded that wind forces will not inhibit the operations envisaged for Bull Arm.

9. Fog:

Connection fog commonly occurs during May, June and July, blowing across the isthmus from Placentia Bay during periods of westerly wind. Generally speaking, fog conditions in Trinity Bay are less severe than those prevailing in Placentia Bay and along the south coast.

10. Currents

Only minor currents associated with tidal movements occur in Bull Arm. There is no evidence of littoral drift.

11. Tidal Variation:

The maximum tidal variation is 3¼ ft. at the entrance to Bull Arm, and a probable variation of 4 ft. at the head. This may be increased somewhat due to "wind set" during strong northeasterly or easterly storms.

12. Seabed Conditions:

The seabed in Bull Arm tends to be rocky in the outer portions, with mud and sand predominating in the inner harbour. Foundations conditions should be satisfactory for the construction of heavily loaded marine structures.

13. Distance to Grand Banks Exploration/Production Activities:
Not important.

14. Land Availability Foreshore:

Near the proposed site, which is just outside McKay Island on the south side of Bull Arm, a foreshore area of 50 acres can be readily developed.

15. Industrial Land Availability:

Approximately 100 acres of relatively flat land lies within ½ mile of the site. Some grading will be required to make this land suitable for industrial use, as well as some bog removal.

16. Topography:

This area has a very thin cover of till along both sides of the Arm and minor amounts of sand and gravel near Centre Bay. It is expected to have stable subsoils.

Physical and Social Infrastructure

17. Water Supply:

No access to municipal water supply.

18. Power Supply:

5-8 megawatts are required for steel platform construction and 3-4 megawatts are required for concrete platform construction. Power transmission lines to the Avalon run across the Isthmus and the refinery area is supplied with a line from the main transmission lines. Power lines could be supplied almost immediately at very little expense.

19. Sewage Disposal:

No access to sewer services.

20. Solid Waste Disposal:

Separate site would have to be acquired.

21. Housing:

There is a considerable amount of serviced land in the immediate area which could accommodate additional housing, and other areas which are capable of such development upon servicing. Given the large scale, fluctuating and specialized labour force involved in steel and concrete gravity platform fabrication it is likely that such operations would have residential camps established.

22. Schools:

There are only two schools in Sunnyside and Come By Chance with 17 teachers and 266 students. There is additional capacity for approximately 90 students. However, depending on the make-up of new residents and their numbers, school and other community facilities may prove to be inadequate.

23. Vocational Schools:

The nearest vocational school is in Clarenville - 15 miles away.

24. Access to Medical Facilities:

There is a 24 bed hospital in Come By Chance and 3 physicians. There is a new hospital slated for Clarenville in 1982.

25. Highway Access:

Sunnyside is linked by road to the T.C.H. This road does not give direct access to the development area, which itself abutts the T.C.H. on the western boundary. The road to Sunnyside continues through the community along the north shore of Bull Arm. An access road from the development area to the T.C.H. would be required.

26. Rail Access:

The Canadian National Rail line in the Come By Chance - Sunnyside area runs roughly parallel with and west of the T.C.H. Rail access to Bull Arm area would require a spur running from some distance or crossing the Highway.

27. Airport Access:

The nearest airport is St. John's, 55 miles east.

Environmental Preview

28. Resources:

There is one salmon river in the area, Come By Chance River. There are no moose or caribou wintering or calving areas within a 36 mile radius. The development area is vacant.

Forestry

The forest resource capability is almost nil. The area is sub-marginal and there is limited potential for reforestation.

Agriculture

The agriculture resource capability is almost nil. However, there are sections of land within the area with agriculture potential.

Fisheries

In 1980 there were 555 registered boats within a thirty mile radius, 1056 fishermen (235 manyears) accounting for 36.8 million lbs. and a landed value of 4.8 million dollars. There are eight processing operations (Clarenville to Fairhaven) employing 440 (319 manyears) persons.

Recreation

There is a low to moderate capability for recreational use but site areas would not be in conflict.

29. Acoustic Impact:

The proposed site is sufficiently removed from residential areas so there should be a minimal impact in noise levels.

30. Visual Aesthetics:

No impact anticipated.

Social and Economic Considerations

A large in-migration of workers in an area of communities with populations ranging from 400 to perhaps 1200 could be large and negative. The facilities in these communities would be inadequate and even if a residential camp is established would still have a large impact on the area.

Bull Arm forms part of a region extending from Clarenville to the north to Long Harbour in the south and has a combined population of 16,690 (1976 census). The combined labour force population in 1976 for this area was 4,800 and the unemployment rate was 21.8%.

January, 1981, figures for unemployment insurance were used to give some indication of labour supply in the region would be available for employment at the site. Steel platform construction requires a highly skilled labour force, approximately 65% trades related. In the Bull Arm - Sunnyside-Come By Chance area of the 2,288 recepients, 30.9% (707) were listed as construction workers and 4.4% (101) as machinery and fabrications. The remaining occupations were not considered. From this information it would appear that there is not a suitable labour force available in the area and that if the site is developed it will mean a large in-migration of workers.

Pre-Conditions for Site Suitability

In addition to the site development costs listed there would be a requirement to upgrade social infrastructure. The amount and degree of upgrading required however would depend on the number of people moving into the area. Cost figures cannot be estimated as the potential in-migration cannot be determined at this stage.

(Steel Platform Construction)

Site Development Costs:

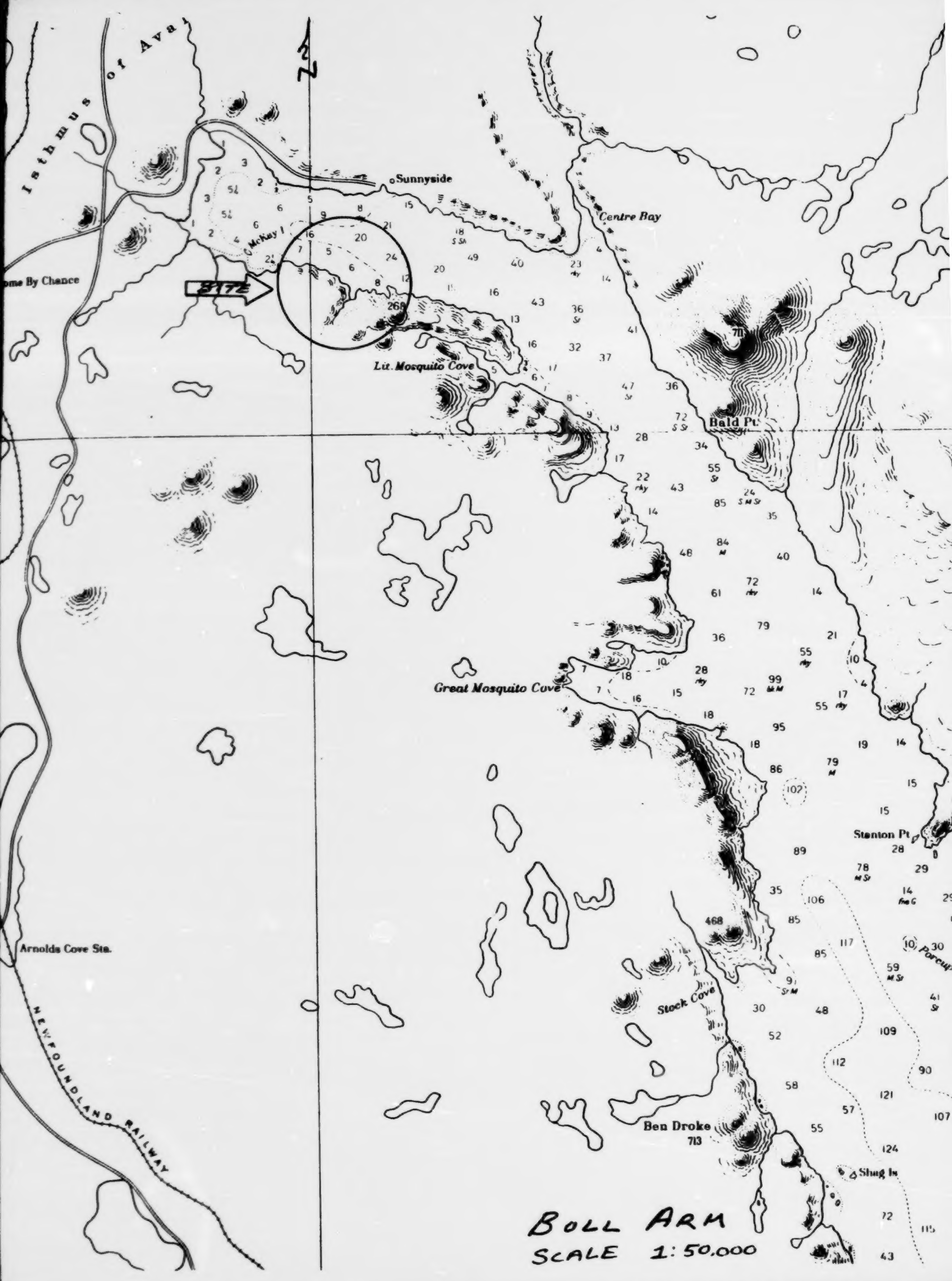
(a) Dock & fitting out Berth:

1000 docking face	$ 5,000,000
Foreshore site development	1,500,000
Industrial Land development	1,800,000
Access to T.C.H.	500,000
Industrial water system	1,200,000
Total	$10,000,000

(b) Site Development Cost for Concrete Platfrom Construction.

Graving dock	$ 21,000,000
Wharf	5,000,000
Foreshore Development	1,500,000
Industrial Development	1,800,000
Highway Access	500,000
Water Supply	1,200,000
Contingencies	1,500,000
Total	$ 32,500,000

The cost for social and local services in addition to internal facilities will be extra.


Isthmus of Avalon
Sunnyside
McKay I.
SITE
Come By Chance
Centre Bay
Lit. Mosquito Cove
Bald Pt.
Great Mosquito Cove
Stanton Pt.
Porcupine
Stock Cove
Arnolds Cove Sta.
NEWFOUNDLAND RAILWAY
Ben Droke
713
Shag Is
N

BOLL ARM
SCALE 1:50,000

PRELIMINARY EVALUATION
CARMANVILLE
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: CARMANVILLE

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	0	semi-protected 400 A	
- waveheight (3 ft.)		available	
- cargo wharf 33' draft (500 ft.)		available	
- supply wharf 20' (900 ft.)			
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	yes	available	
- channel width (800 ft.)	300'	not sufficient	
- approach depth (33 ft.)	yes		
- turning basin (1000 ft.)	750'	not sufficient	
3. FORESHORE AREA (20 A)		not available	
4. INDUSTRIAL AREA (200 A)		attainable	
5. ICE FREE (5% interference)	<5%	attainable	
6. PROXIMITY TO DEVELOPMENT			
7. TRANSPORT NETWORK			
- highway		local rds. need upgrading	10
- rail		nearest Gander	5
- air		nearest Gander	5
B. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE	excess		
- schools	100		2
- vocational schools	no	nearest Gander	2
- medical facilities	clinic	Gander 41 mi nearest	0
- housing		undeveloped, no services	0
- power supply	yes	attainable	10
- sewage disposal	no	in planning stage	0
- solid waste disposal		separate area needed	0
9. WATER SUPPLY	yes	capacity not suited to Supply Base	0
0. QUALIFIED LABOUR			
- construction (200)	1091	reg. labour pool suff.	10
- fabrication (100)	100	unemployed skills suff.	10
1. LAND USE COMPATIBILITY			
- fishing		some potential	7
- forestry		some potential	8
- agriculture		no conflict	10
- salmon rivers		no conflict	10
- wildlife		no conflict	10
C. CAPITAL COST			

CARMANVILLE

General Description

The town of Carmanville is located on the northeast coast of Newfoundland; on the southern shoreline of Hamilton Sound which is the Strait between the mainland of Newfoundland and Fogo Island, 12 miles to the north. The area is connected to Gander via route 330, 41 miles to the south which is the central service area.

Carmanville is a very small community (1000 population). It is fairly isolated and surrounded by even smaller communities - Noggin Cove, Davidville, Frederickton, Beaver Cove. Labour force population is estimated at 250 for the subregion.

The site proposed for development is on the west side of Carmanville Arm where the existing public wharf is situated. There would be no conflict with ferry operation which docks inside the wharf but could be problems both in terms of traffic and loading operations.

Description of Harbour, Foreshore and Hinterland

1. Protected Area (33 ft. draft)	0
2. Semi-Protected Area	400 acres
3. Channel Depth at 33 ft.	33 ft.
Harbour Depth	33 ft.
4. Channel Width at 33 ft.	300 ft.
Approach Entrance	2800 ft.

5. Turning Basin at 33 ft. 750 ft.

6. Existing Wharfage and Docks:

There is a public wharf, length 201 x 131 ft. with depth alongside of 20-25 ft. The facility is wood with a concrete deck and has a storage shed. Use of facility on a shared basis.

7. Ice Restricted Access:

Landfast ice occurs in sheltered areas of Notre Dame Bay between late December and April. Pack ice which occurs in February does not usually reach area until much later. Ice is usually less than 50 cm thickness which would not impede passage of ice strengthened supply vessels.

8. Wave Restricted Access:

Carmanville is exposed to waves from the NE. These would tend to dissipate in the shallower waters between Fogo Island and the Mainland.

9. Wind Direction and Speed:

Prevailing westerly winds (SE,SSW) average speed of 22 miles per hour. Maximum observed hourly speed of 82 miles per hour with gust to 78 miles per hour.

10. Fog:

Prevailing offshore winds would keep fog to open sea rather than close to land.

11. Currents: - Unknown.

12. Tidal Variation: 4.7 feet.

13. Seabed Conditions:

Silt, sand, gravel and boulders overlying bedrock.

14. Proximity to Production/Drilling Activity: - 375 miles.

15. Land Availability Foreshore:

Land adjacent to docking area is largely privately owned and the site of residential development. The land is level and/or naturally graded with the foreshore area a small height above water level. 2-3 acres of land are available within 1 km.

16. Industrial Land Availability:

Carmanville is typically laid out in a strip development fashion similar to many coastal communities. There appears to be considerable vacant backland which could be developed for industrial purposes.

17. Topography:

Area is covered mostly by a thin till veneer with a marine terrace along the coastline with minor amounts of gravel. Expected to have stable subsoils.

Physical and Social Infrastructure

18. Water Supply:

The town gets its water supply from two artesian wells with a combined capacity of 440,000 gpd. The system is not designed for fire flows. Level of consumption is not known. This system may not be adequate for a supply base.

19. Power Supply:

Could be supplied.

20. Sewage Disposal:

No system, in planning stage.

21. Solid Waste Disposal:

A separate area would be needed for a permanent supply base.

22. Housing:

From topographic charts there appears to be no shortage of land which could be suitable for residential development. In planning stage.

23. Schools:

There is one school with 27 teachers and an enrollment of 421 pupils. Excess capacity for approximately 100 students.

24. Vocational Schools:

Nearest vocational school Gander, 41 miles south.

25. Access to Medical Facilities:

There is one clinic and a physician. There is no ambulance service and the nearest full hospital service is in Gander.

26. Highway Access:

The area is served by the Gander Bay Road (Route 330) which is in good condition and connects the community with the T.C.H.

27. Rail Access: Nearest Gander.

28. Airport Access: Nearest Gander.

Environmental Preview

29. Resources:

Seabirds and Waterfowl

No seabird sanctuary in area.

Moose and Caribou

No wintering or calving grounds within immediate area.

Agriculture

No conflict.

Forestry

Forest resources at or near proposed site are minimal. Within the catchment area there are 59 sawmilling operations with a 1980 production of 1,545,000 fbm and an estimated manyear effort of 52.

Fisheries

In 1979 there were 1,512 fishermen within a 30 mile radius with a manyear effort of 279. Landed catch totalled 25 million lbs. and had a landed value of 3.48 million dollars.

20. Acoustic and Visual Impact:

Minimal as site is already used for shipping operations.

Social and Economic Considerations

Carmanville is a very small town with limited infrastructure unsuited to a full scale service base operation. While there appears to be a high level of unemployment it is unknown whether or not the skills of the unemployed are suited to supply/service operations for the offshore petroleum industry.

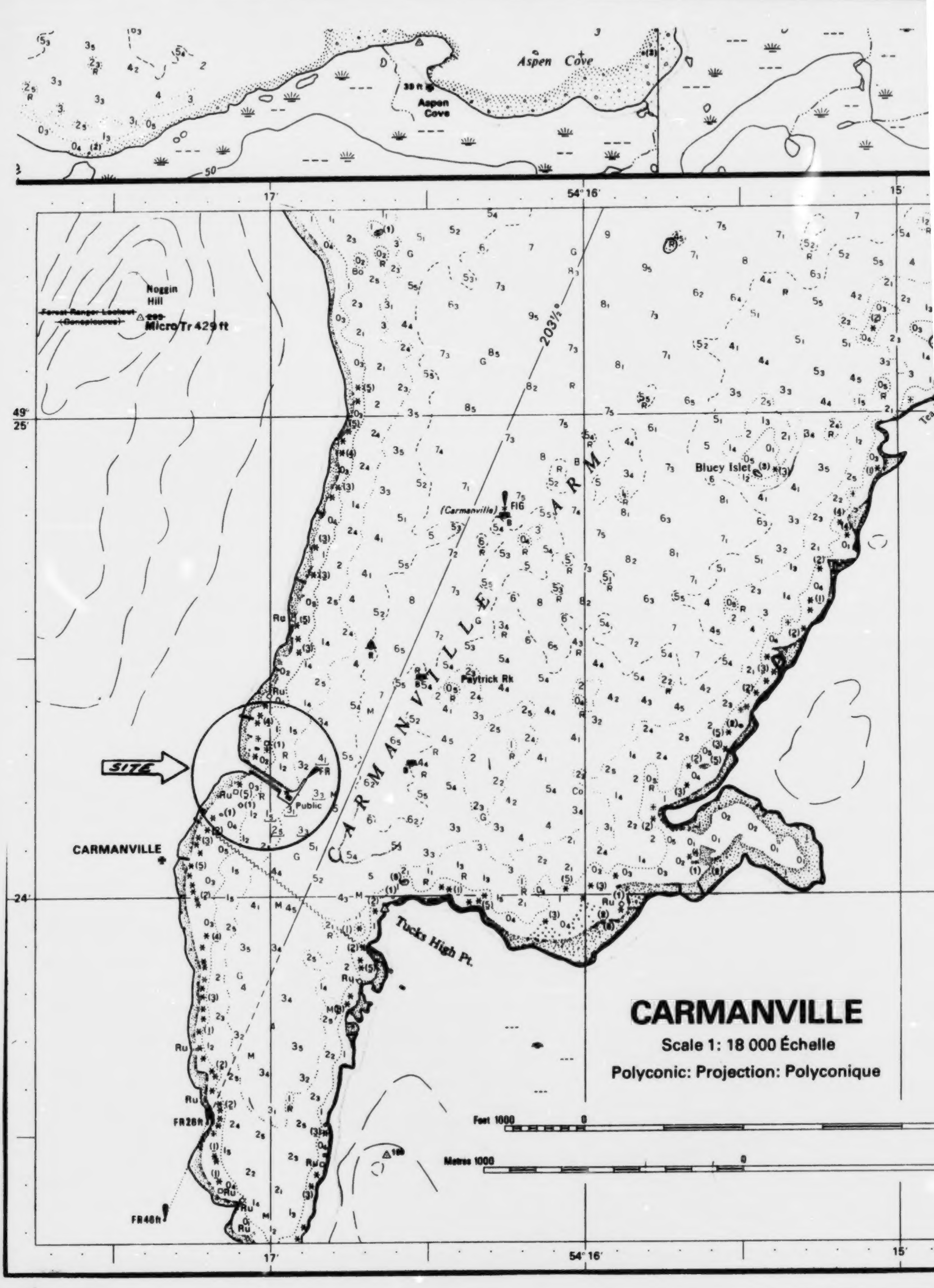
Pre-Conditions for Site Suitability

If a supply/service base were to be established in Carmanville an extensive investment in physical and social infrastructure would be required. Costs are difficult to estimate at this stage.

On Site Development Costs (Satellite Supply Base)

Water Supply	$ 1,800,000
Contingencies	200,000
	$ 2,000,000

The costs of prevailing industrial facilities, internal, local and social services will be extra.


Aspen Cove
Aspen Cove
35 ft
50
17′
54° 16′
15′
49° 25′
24′
Noggin Hill
~~Forest Ranger Lookout (Conspicuous)~~
Micro Tr 429 ft
203½°
(Carmanville) FlG
CARMANVILLE ARM
Bluey Islet
Paytrick Rk
SITE
Public
CARMANVILLE
Tucks High Pt.
FR28ft
FR48ft
CARMANVILLE
Scale 1: 18 000 Échelle
Polyconic: Projection: Polyconique
Feet 1000
Metres 1000
0

PRELIMINARY EVALUATION
CLARENVILLE
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: CLARENVILLE

		Actual	Remarks	Ranking
A.	Physical and Economic (critical)			
1.	SHELTERED HARBOUR			
	- protected area (150 A)	2000+		
	- waveheight (3 ft.)	< 3'	well protected	
	- cargo wharf 33' draft (500 ft.)	Nil	to be constructed	
	- supply wharf 20' (900 ft.)	375'	in use by Nfld. Hardwoods (to be constructed)	
2.	ADEQUATE DEPTH			
	- harbour depth (33 ft.)			
	- channel depth (33 ft.)	204	sufficient	
	- channel width (800 ft.)	1750'	sufficient	
	- approach depth (33 ft.)	33'	7100' wide	
	- turning basin (1000 ft.)	4400'	sufficient	
3.	FORESHORE AREA (20 A)	8.5	insufficient	
4.	INDUSTRIAL AREA (200 A)	111	to be reclaimed or dev.	
5.	ICE FREE (5% interference)		an extreme year-closed 10 day	10 Critical
6.	PROXIMITY TO DEVELOPMENT	275 mi		8
7.	TRANSPORT NETWORK			
	- highway	available	local roads need upgrading	10
	- rail	av.		10
	- air	av.	Gander, St.John's 150 km, 180 km	0
B.	SOCIAL AND ENVIRONMENTAL (ranked)			
8.	EXISTING INFRASTRUCTURE			
	- schools	150 vac.		4
	- vocational schools		local school-has ind.profile	5
	- medical facilities		new hospital planned	5 (10 in '82)
	- housing	177 lots	100 serviced, land banking	10
	- power supply		controlled by NL&P	10
	- sewage disposal	small sy.	required for base	0
	- solid waste disposal	landfill exists	required for base	0
9.	WATER SUPPLY (34,000 gpd)	1.2 mil.	extension required	10
10.	QUALIFIED LABOUR		Total	
	- construction (200)		6111 tax payers	10
	- fabrication (100)		1015 const., 125 fab.	10
11.	LAND USE COMPATIBILITY			
	- fishing		1271 fishermen, 7 proc. plants	7
	- forestry		343 mills to supply base	0
	- agriculture		no agriculture dev.	10
	- salmon rivers		Shoal Hr. river, not on site	9
	- wildlife			4
C.	CAPITAL COST			

CLARENVILLE

General Description

The Town of Clarenville is located in Trinity Bay on the east coast of Newfoundland, approximately midway between St. John's and Gander. The general topography of the area is hilly with a ridge of broken peaks rising to heights of 150 m. above sea level running parallel to the coastline. The ridge falls sharply towards the sea so that its coastal edge is characterized by moderate to severe slopes. The coastline forms many natural harbours most of which are too shallow for deep draught ships. The town site lies on the west side of Northwest Arm and is protected from the open sea by Random Island.

The town is accessible from both the east and west via the T.C.H., approximately 180 km and 150 km from St. John's and Gander respectively.

The town of Clarenville has a population of approximately 3000. Within a commutershed of 30 minutes travel time there is a population of approximately 13,000 from Arnold's Cove to Port Blandford. Clarenville does however represent the hub of a trading centre of approximately 64,000 (1976 census).

The site chosen for supply and service base development is that adjacent to Newfoundland Hardwoods on land that is designated for industrial purposes and borders on commercial properties (from Town of Clarenville municipal plan amended May, 1980). The land is privately owned and appears to be landfill reclaimation which would be facilitated by the presence of a small hill of solid rock on the property as well as a shoal coastline.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland) min. 33 ft. draft	2000+ acres
2.	Protected Area (North West Arm)	large
3.	Channel Depths Harbour Depths	204 ft. 120 ft.
4.	Channel Widths (33 ft.) Approach Entrance (33 ft.)	1750 ft. 7100 ft.
5.	Turning Basin (diameter at 33 ft.)	4400 ft.

6. Existing Wharfage and Docks:

On the proposed site Newfoundland Hardwoods has a 372 ft. wharf with 18-25 ft. draft.

There is one government wharf 100 ft. x 30 ft. with 15-18 ft. draft built in 1964. Uniform loading is set at 50 PSF.

There are a number of small privately owned crib wharves used for fishing and recreational purposes.

7. Ice Restricted Access

In general Clarenville remains ice free on a year round basis. Land fast harbour ice may occur but generally limits itself to the Shoal Harbour area to the west of the proposed site.

During an average ice year,pack ice lies east of Trinity Bay from late February to mid April. On average, ice of 1/10 or greater concentration will block the entrance to the bay for 24 days/year. An ice strengthened supply vessel should be able to navigate into Trinity Bay on 80-90% of these days. During an extreme ice year however, the entrance to Trinity Bay can be blocked for 90 days.

Ice conditions at the head of Trinity Bay are considerably less severe than those at the entrance to the Bay. The frequency of pack ice at the head of the Bay is generally one-third of the frequency at the entrance to the Bay.

8. Wave Restricted Access:

Clarenville is well protected from waves in any direction.

9. Wind Direction and Speed:

Winds are predominantly from the southwest quadrant (approximately 50%). Wind speeds vary on average from 14.2 to 18.4 m.p.h. with a maximum observed hourly speed of 70 m.p.h. and maximum observed gust speed of 102 m.p.h.

10. Fog:

As no meteorological observations are documented for the Clarenville area specifically no figures are available at this time. Nevertheless, as the Clarenville area is influenced by the much drier weather moving over a large land mass considerably less fog is experienced than other areas of the east coast such as St. John's, Bonavista and Argentia.

11. Currents:

The geographic position of Clarenville at the end of Northwest Arm removes it from any geostrophic current regimes. As such any currents would be predominantly tidal with minor wind driven surface effects.

12. Tidal Variation:

Clarenville has one of the lowest tidal variations at 3.5 ft. and would not hamper docking and/or loading operations.

13. Seabed Conditions

Varying depths of silt, sand and gravel overlying bedrock (shattered).

14. Proximity to Exploration/Production Activity: - 275 miles.

15. Land Availability Foreshore:

Most of the land in the proposed site area is owned by or borders on existing industrial/commercial properties, ie., Newfoundland Hardwoods, Imperial Oil Limited, and Department of Highways. Along the foreshore (approximately 1000') the land slopes steeply away from the water to a height of 40-50 ft. The proposed site envisages construction of a 1000 ft. marginal pier with landfill to provide approximately 8.5 acres of usable land. An additional 2.5 acres is presently occupied by the Department of Highways.

16. Industrial Land Availability:

The site proposed indicates reclaimation of 11 acres of industrial purpose land. The Clarenville Town Plan calls for the development of 100 acres of industrial purpose land at the western end of the Town.

17. Topography (surficial geology):

Most of the area outlined contains very little till, except for a small area of lineated till to the west. Inland from Shoal Harbour, there are substantial outwash deposits given in zone 1 category. Expected to be stable.

Physical and Social Infrastructure

18. Water Supply:

Clarenville's water supply is derived from Lower Shoal Harbour River with a design flow capacity of 1.2 million gallons per day. The present system utilizes a covered steel tank resevoir with a storage capacity of one million gallons. Water mains will need to be extended a distance of 2000 ft. from existing supply to the edge of the proposed wharf.

19. Power Supply:

The power supply in the area is controlled by Newfoundland Light and Power.

20. Sewage Disposal:

The sanitary sewage system in Clarenville presently serves 600 units. Ninety septic tanks are also in use. Treatment facilities in place consists of two communities and the outfall is located at the seashore.

Since the site is on waterfront location there should be no problem with disposal of sewage. Depending however on the volume and nature of waste water generated by offshore operation, sewage treatment may be required at the base.

21. Solid Waste Disposal:

Domestic solid wastes are presently collected twice weekly for disposal at a landfill dump. The site is 2 miles from the town and services a population of 5000 approximately.

A permanent base may require a separate landfill site. In that event approximately 9 ha would be required.

22. Housing:

There is no shortage of land for residential development. Presently there exists 60 acres of land held under land banking with 177 building lots available for sale from Newfoundland and Labrador Housing Corporation. One hundred of these lots are serviced.

23. Schools:

School enrollments indicates in a general way the size of existing facilities. There are three integrated schools in Clarenville with a total of 56 teachers and an enrollment of 1,100 students. There is an additional capacity to accommodate 150 students and a new school is planned for Shoal Harbour.

24. Vocational Schools:

There is a district vocational trades school located in

Clarenville presently offering courses in electrical, welding, mechanics, drafting, accounting and secretarial skills.

25. Access to Medical Facilities:

Clarenville presently has 2 medical clinics serviced by 9 physicians, 3 dentists and 3 public health nurses. The area is also serviced by a small hospital 30 miles away. Ambulance service is available. A new hospital for Clarenville is planned for construction in 1982.

26. Highway Access:

The Trans Canada Highway which by-passes the built-up area of the town links it to St. John's and Gander, the Bonavista Highway connects it with the Bonavista Peninsula. Furthermore, the newly built Manitoba Drive provides the community with another access to the T.C.H. Generally, the major problems of the local roads are inadequate widths, severe gradients and unprotected level crossings.

27. Rail Access:

Rail access is provided by C.N. to a station and switching yard which presently borders on the proposed site.

28. Airport Access:

Clarenville is located approximately 150 km from the Gander International Airport and 180 km from Torbay Airport.

Environmental Preview

29. Natural Environment:

The area proposed for development presently borders on or envelopes commercial/industrial land under existing usage. There is a salmon river nearby (Shoal Harbour River) which has experienced a decline in catch from 21 in 1977 to 5 in 1979.

Clarenville is 30 miles from the wintering grounds of wildlife, i.e., caribou and moose and approximately 12 miles from caribou calving grounds.

Terrestrial wildlife would not be directly effected by development on the shore or near shore areas.

Seabirds and Waterfowl

Seabirds are the most vulnerable of the natural species which could be affected by oil development. While there are a variety of seabirds and waterfowl in the Clarenville area and all species use coastal regions for feeding purposes, this area is not a seabird sanctuary. Major damage would result only in the event of an oil spill.

Fisheries

In 1980 there were 816 licensed boats in the inshore fishery from Arnold's Cove to Lethbridge; 1271 fishermen (249.5 manyears) with a total landing of 66.2 million lbs. and a landed value of $5.5 million. There are 7 fish processing operations employing 385 persons or 302 manyears.

Agriculture

There is no conflict with the proposed site and any proposed agriculture development area.

Forestry

Within the catchment area (30 mile radius) there are some 343 sawmilling operations with a manpower effort of 218 people and a production level of 6.5 million fbm. The Clarenville area in general is well-forested and has a high forestry potential. The forest stands are high yield on a per-unit basis. The demand in Clarenville for forest products, especially construction timber is very high. The area, at the same time, has been struck heavily by spruce budworm infestation. While there are pockets of high, medium and low priority areas operations are sufficiently removed from site to have any conflict. Impact would only be in relation to drainage on existing workforce which cannot be determined at present.

Recreation

The Clarenville area has a low to moderate capability for dispersed recreational use. However, the site area is already being used for industrial purposes and would not conflict with recreational uses.

Social and Economic Considerations

30. Community Services:

Clarenville acts as a service centre for a number of smaller communities in the area. The level of services available are in relation to the population base. A moderate influx of people could be accommodated without strain on existing facilities.

31. Demographic Change:

Could range from slight to moderate depending on the scale of activity and the number of in-migratrants necessary to meet labour demand.

32. Labour Force Characteristics:

The town of Clarenville has a population of 3000 and a subregional population extending from Arnold's Cove to Port Blandford commutershed of 13,000. In 1978 the number of taxpayers in this subregion were 6,111 with an average income of 9,401.

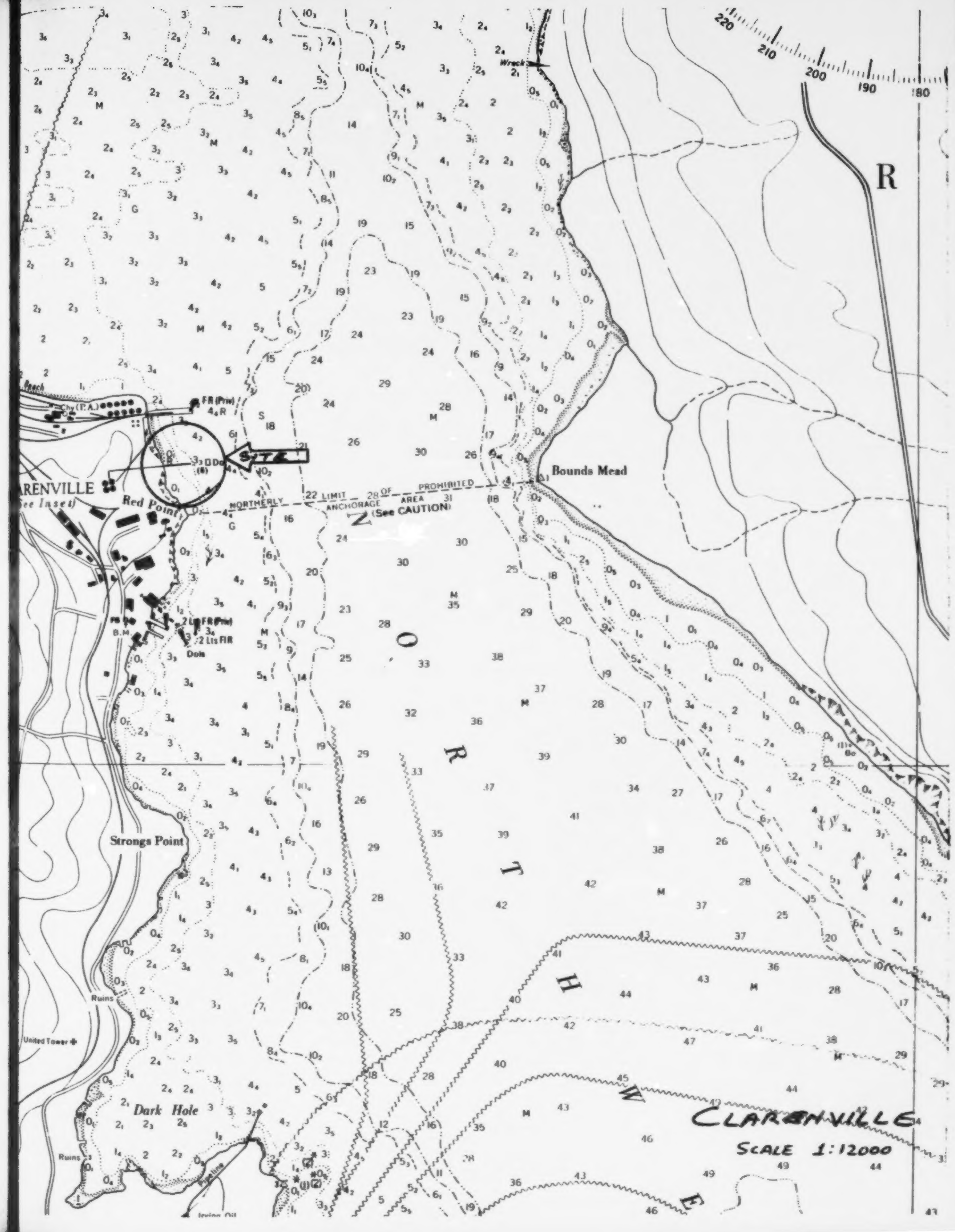
To get some indication of the available labour pool presently unemployed and available for work on a supply base; unemployment insurance figures for January, 1981, were used for the subregional area. Of the 3,171 unemployed 32.0% (1015) were listed as construction workers, 3.4% (124) as machinery and fabrication, and 5% (157) as transport equipment and material handling with the rest being split between the remaining categories. There would appear to be a sizeable work force available to meet demands of a supply/service base operation.

Pre-Conditions for Site Suitability

33. Constraints:

The Town of Clarenville have provided cost estimates in relation to site development. These figures are reasonable and are presented here.

Phase I	
Land Assembly	200,000
Dock Facilities & Site Work	2,000,000
Industrial Water Supply	200,000
Contingencies	600,000
	3,000,000
Phase II	
Dock Facilities	2,000,000
Access Road	500,000
Contingencies	600,000
	3,100,000
Total	6,100,000


SITE
ARENVILLE
(See Inset)
Red Point
Bounds Mead
Strongs Point
Dark Hole
NORTHERLY LIMIT OF PROHIBITED ANCHORAGE AREA (See CAUTION)
NORTH WE
R
Wreck
FR (Priv)
Chy (P.A.)
2 Lts FR (Priv)
2 Lts FlR
Dols
B.M.
Ruins
United Tower
Pipeline
Irving Oil
220
210
200
190
180

CLARENVILLE

SCALE 1:12000

PRELIMINARY EVALUATION
COME BY CHANCE AREA
AS A LOCATION FOR
CONCRETE PLATFORM CONSTRUCTION

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: COME BY CHANCE

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR	1000 A	suitable/unprotected	
- cargo wharf 500' at 33'			
- Dock 650'X650' at 33'		drydock not av.	
channel width 800'	700'@36'		
- Buildup Site 800' at 260'		13,400 from wharf	
- Tow-out Base			
min depth 425', min width 2000'	600'/3300	available	
- Wave height, 3'	15-18'	breakwater required	
- Deep Sink 660'deep,800' wide	2000'@ 660'	23,000' from wharf	
2. FORESHORE AREA (50 A)	Av.	may need some dev.	
3. INDUSTRIAL AREA (200A)	Av.	may need some dev.	
4. ICE FREE (5% interference)		practically ice free	
5. TRANSPORT NETWORK			
- highway	T.C.H.	acesss required	9
- rail		needs spur or hi/ crossing	10
- air		nearest St. Johns	6
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools (400 vac.)	90 vac.	some excess	2
- vocational schools	Clarenv.	nearest Clarenville	3
- medical facilities	cot.hosp	cottage hospital	5
- housing	lot	houes & land suff.	10
- power supply	easy		10
- sewage disposal		need to be dev.	0
- solid waste disposal		" " "	0
2. WATER SUPPLY	none	needed	0
3. QUALIFIED LABOUR		Total Labour 4800	
- construction (700)	707	past exp.of refinery	10
- fabrication (350)	101	707 const.,101 fab	1
4. LAND USE COMPATIBILITY			
- fishing		1056 fishm,440 pro.	8
- forestry		little potential	7
- agriculture		little potential	10
- salmon rivers		Come By C. River	9
- wildlife			9
C. CAPITAL COSTS			

COME BY CHANCE

A site in Placentia Bay, located 3 miles south of the Come By Chance oil refinery, has been nominated by Lundrigans Limited, as a base for the construction of gravity-type concrete platforms. The site is located immediately south of Adams Head, and is less than a mile from the town of Arnold's Cove.

The concept put forward for this site involves the construction of a breakwater-wharf on the southwest side of a small cove near Adams Head, and the construction of a graving - dock and shoreside facilities immediately behind the wharf. This facility will be used for casting the bottom portion of the concrete platform, which will then be towed to a deepwater build-up area immediately to the south east of Bread and Cheese Islands, which are located some 3.5 miles southwest of the shoreside facility. It is proposed to do the build-up and subsequent operations at this offshore site, transplanting men and materials from the Adams Head site on a continuous basis.

The proposed site is located in a region, which, for planning purposes, includes the area from Clarenville in the north to Long Harbour towards the south. The combined regional population was 16,690 in 1976. All towns and villages in the area are within commuting distance of the proposed site. In fact, during the construction of the Come By Chance oil refinery, workers commuted to towns in Conception

Bay regularly without apparent inconvenience or difficulty

Description of Harbour, Foreshore and Hinterland

1. Protected Area at Adams Head facility	30 acres
2. Water Depths: (at LWOST)	
(a) Entrance to graving dock	40' (to be dredged)
(b) Alongside breakwater-wharf	25' - 40'
(c) Build-up & mating area	600' - 900'
(d) Tow-out channel	600+
3. Channel Width	2 miles+
4. Turning Basin	4 miles+

5. Existing Wharfage and Docks:
   - (a) Oil refinery terminal wharf - Come By Chance
   - (b) Tug Wharf - Come By Chance
   - (c) "Procan" wharf - Come By Chance
   - (d) Public Wharf - Arnold's Cove

   (NOTE: The tug wharf and the "Procan" wharf at Come By Chance can accommodate medium draft cargo ships, and could be used in support of the initial facility construction.)

6. Ice Restricted Access:

Placentia Bay was ice-blockaded for two weeks in 1973 with the last prior blockade occurring in the late 1930's. It can for practical purposes, be considered as being ice-free.

7. Wave Restricted Access:

Maximum wave heights of 15-18'have been recorded near this site, resulting from strong southwest to southerly winds.

8. Wind Condition and Speed:

The attached wind-rose for Torbay airport is fairly representative of wind conditions in the Come By Chance area.

9. Currents:

0 - 8 knots alongshore.

10. Tidal Variation: - 8.3 ft. (springs)

11. Seabed Conditions:

Predominantly shingle and sand at onshore site, unclassified at buildup site.

12. Land Availabiity:

Adequate amounts of both foreshore and backup industrial land are available on this site. The land is generally level, with a maximum elevation of 50'. Some bog removal will be required to develop the backup industrial land.

Physical and Social Infrastructure

13. Water Supply:

No access to municipal water supply.

14. Power Supply:

5-8 megawatts are required for steel platform construction and 3-4 megawatts are required for concrete platform construction. Power transmission lines to the Avalon run across the Isthmus and the refinery area is supplied with a line from the main transmission lines. Power lines could be supplied almost immediately at very little expense.

15. Sewage Disposal:

No access to sewer services.

16. Solid Waste Disposal:

Separate site would have to be acquired.

17. Housing:

There is a considerable amount of serviced land in the immediate area which could accommodate additional housing, and other areas which are capable of such development upon servicing. Given the large scale, fluctuating and specialized labour force involved in steel and concrete gravity platform fabrication it is likely that such operations would have residential camps established.

18. Schools:

There are only two schools in Sunnyside and Come By Chance with 17 teachers and 266 students. There is additional capacity for approximately 90 students. However, depending on the make-up of new residents and their numbers, school and other community facilities may prove to be inadequate.

19. Vocational Schools:

The nearest vocational school is in Clarenville - 15 miles away.

20. Highway Access:

Sunnyside is linked by road to the T.C.H. This road does not give direct access to the development area, which itself abutts the T.C.H. on the western boundary. The road to Sunnyside continues through the community along the north shore of Bull Arm. An access road from the development area to the T.C.H. would be required.

21. Rail Access:

The Canadian National Rail line in the Come By Chance - Sunnyside area runs roughly parallel with and west of the T.C.H. Rail access to Bull Arm area would require a spur running from some distance or crossing the Highway.

22. Airport Access:

The nearest airport is St. John's, 55 miles east.

Environmental Preview

23. Resources.

There is one salmon river in the area, Come By Chance River. There are no moose or caribou wintering or calving areas within a 36 mile radius. The development area is vacant.

Forestry

The forest resource capability is almost nil. The area is sub-marginal and there is limited potential for reforestation.

Agriculture

The agriculture resource capability is almost nil. However, there are sections of land within the area with agriculture potential.

Fisheries

In 1980 there were 555 registered boats within a thirty mile radius, 1056 fishermen (235 manyears) accounting for 36.8 million lbs. and a landed value of 4.8 million dollars. There are eight processing operations (Clarenville to Fairhaven) employing 440 (319 manyears) persons.

Recreation

There is a low to moderate capability for recreational use but site areas would not be in conflict.

24. Acoustic Impact:

The proposed site is sufficiently removed from residential areas so there should be a minimal impact in noise levels.

25. Visual Aesthetics: - No impact anticipated.

Social and Economic Considerations

A large in-migration of workers in an area of communities with populations ranging from 400 to perhaps 1200 could be large and negative. The facilities in these communities would be inadequate and even if a residential camp is established would still have a large impact on the area.

Bull Arm forms part of a region extending from Clarenville to the north to Long Harbour in the south and has a combined population of 16,690 (1976 census). The combined labour force population in 1976 for this area was 4,800 and the unemployment rate was 21.8%

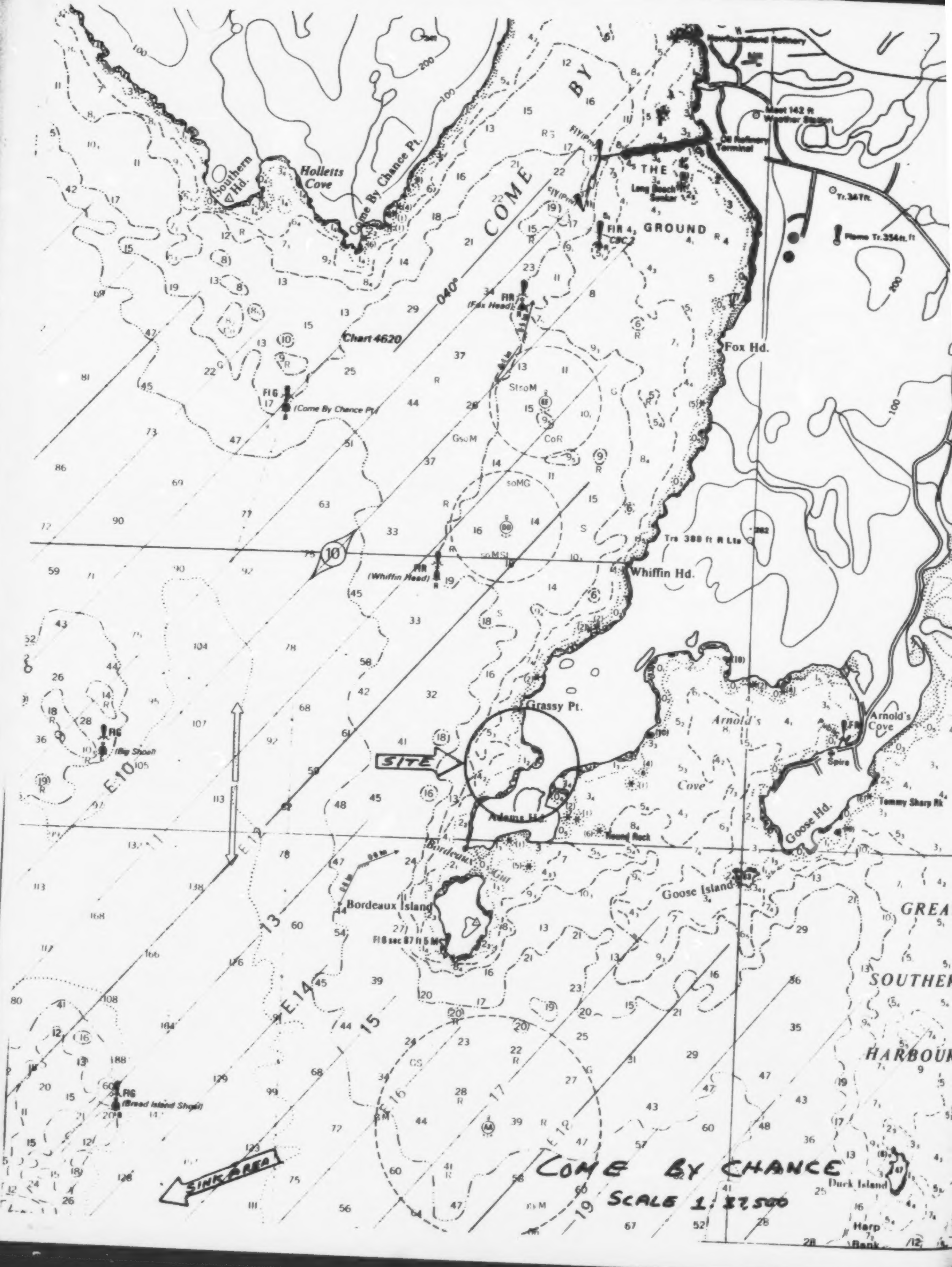
January, 1981, figures for unemployment insurance were used to give some indication of labour supply in the region would be available for employment at the site. Steel platform construction requires a highly skilled labour force, approximately 65% trades related. In the Bull Arm - Sunnyside - Come By Chance area of the 2,288 recepients, 30.9% (707) were listed as construction workers and 4.4% (101) as machinery and fabrications. The remaining occupations were not considered. From this information it would appear that there is not a suitable labour force available in the area and that if the site is developed it will mean a large in-migration of workers.

Pre-Conditions for Site Suitability

In addition to the site development costs listed there would be a requirement to upgrade social infrastructure. The amount and degree of upgrading required however would depend on the number of people moving into the area. Cost figures cannot be estimated as the potential in-migration cannot be determined at this stage.

Site Development Costs: These are estimated as follows:

Breakwater-wharf (concrete crib)	$ 3,000,000
Graving dock	21,000,000
Site Preparation (including 800 man camp)	2,700,000
Water System (3 km)	1,200,000
Access road to T.C.H. (4 km)	1,000,000
	$28,900,000


Southern Hd.
Holletts Cove
Come By Chance Pt.
COME BY THE GROUND
040°
Chart 4620
Fl G (Come By Chance Pt)
Fl R (Fox Head)
Fl R (Whiffin Head)
Fl G (Big Shoal)
Fl G (Bread Island Shoal)
Long Beach Sunker
Newfoundland Refinery
Mast 142 ft Weather Station
Oil Refinery Terminal
Tr. 347 ft.
Flame Tr. 354 ft.
Fox Hd.
Trs 388 ft R Lts
Whiffin Hd.
Grassy Pt.
SITE
Adams Hd.
Bordeaux Gut
Bordeaux Island
Fl G sec 87 ft 5 M
Round Rock
Arnold's Cove
Arnold's Cove
Spire
Goose Hd.
Tommy Sharp Rk
Goose Island
GREAT SOUTHERN HARBOUR
Duck Island
Harp Bank
E.10
E.12
E.14
E.16
E.18
SINK AREA

COME BY CHANCE
SCALE 1: 37,500

PRELIMINARY EVALUATION
CORNER BROOK
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE

b) CONCRETE PLATFORM CONSTRUCTION

c) STEEL PLATFORM CONSTRUCTION

d) MODULE FABRICATION AND ASSEMBLY

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

Location: CORNER BROOK

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	1500	Available	
- waveheight (3 ft.)			
- cargo wharf 33' draft (500 ft.)	1200'	40' deep - currently used	
- supply wharf 20' (900 ft.)		to be developed	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	150'	available	
- channel width (800 ft.)	5000'	available	
- approach depth (33 ft.)	33'	10,000 feet wide	
- turning basin (1000 ft.)	5000'	available	
3. FORESHORE AREA (20 A)	50A	planned to be developed	
4. INDUSTRIAL AREA (200 A)	130A	170A in 1986	
5. ICE FREE (5% interference)	yr.round		
6. PROXIMITY TO DEVELOPMENT	700	distant from Hibernia	1
7. TRANSPORT NETWORK			
- highway		needs new link road	8
- rail			
- air		nearest Deer Lake	7
B. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE			
- schools	200+	excess	5+
- vocational schools	on site		10
- medical facilities		Western Memorial Hosp.	10
- housing		lot of dev. potential	10
- power supply	Av.	site	10
- sewage disposal		needs to be installed for	0
- solid waste disposal		town site may be adequate	10
9. WATER SUPPLY (25-50,000 gpd)	excess		10
10. QUALIFIED LABOUR		labour pool 14,865	
- construction (200)		900 construction	10
- fabrication (100)		150 fabrication	10
11. LAND USE COMPATIBILITY		plants	
- fishing		small fishing, no major	8
- forestry		few sawmills	7
- agriculture			
- salmon rivers		risk to major salmon river	0
- wildlife			10
C. CAPITAL COST			

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: CORNER BROOK

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR			Critical
- cargo wharf 600' at 33'	150A	Available	
- dock 350' at 40'	50'	Attainable	
- Buildup Pier 400' at 40'	50+'	"	
- Assembly Area 400' @ 120'		"	
- Tow out min. 40'	150'	Available	
Harbour depth 115' - 130'	300'	Min. width 3000'	
- Waveheight less than 3'			
2. FORESHORE AREA 20 ha (50 acres)		to be developed	3
3. INDUSTRIAL AREA 60 ha (150 acres)		to be developed	
4. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE		Same as for Supply/ Service Base	
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY	excess		10
3. QUALIFIED LABOUR			
- construction (350)	900		10
- fabrication (700)	150	high skills needed	2
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COST			

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: CORNER BROOK

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			
- cargo wharf 500' at 33'	2000 A	Attainable	
- Dock 650'X650' at 33'			
channel width 800'	5500'	Attainable	
- Buildup Site 800' at 260'	1700'x270'	Available	
- Tow-out Base			
min depth 425', min width 200'	150'/-	Available	
- Wave height, 3'			
- Deep Sink Site 800' wide @ 660'	1950'x660'	Available	
2. FORESHORE AREA (50 A)	50	to be developed	3
3. INDUSTRIAL AREA (150A)		to be developed	
4. ICE FREE 5% interference			
5. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE		same as Supply/ Service Base	
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY	excess		10
3. QUALIFIED LABOUR			
- construction (700)	900		10
- unemployed skills (350)		high skills needed	10
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COSTS			

CORNER BROOK

General Description

Corner Brook is located in western Newfoundland, some 135 miles from Port aux Basques and 430 miles drive from St. John's. The city with a population of some 26,436 people (1976) is located at the mouth of the Humber River where it empties into the Humber Arm and some 25 miles from the Gulf of St. Lawrence. The port is administered by the Ministry of Transport.

Corner Brook is a regional centre for government, education and commerce. The greater Humber Region was estimated to have 43,649 people in 1976. The Bay St. George area with an additional 10,000 people is within 60 mile driving distance on newly constructed high speed, high volume highway. While the population of Corner Brook has remained relatively stable recently the surrounding communities especially Pasadena has grown in size. These outlying areas basically serve as a dormitory area for the city. Corner Brook is divided into the electoral districts of Humber East and West.

The general topography within the city could be classified as hilly. Contours range from zero to 650 feet and generally rise in elevation on each side of Corner Brook Stream. The site which has been considered for development is known as the southern shoal at the eastern end of the

Humber Arm and happens to be that discussed in the proposed Corner Brook Harbour development. Consequently the foreshore area would be a landfill site.

The existing shoreline from Corner Brook Stream to Brakes Cove contains heavy industrial and commercial operations such as a pulp and paper mill, C.N. railyard and docking facilities, North Star Cement, Atlantic Gypsum, Lundrigans Ready Mix Concrete, construction and headquarters. An extensive concrete aggregate quarry borders the site but it is thought to be near depletion. Several commercial operations are located upstream of Brakes Cove. A collector road of low to moderate capacity parallels the Humber in this area. While there is considerable development onshore the shoal area itself is undeveloped. The Corner Brook arterial route takes the truck traffic from the Trans Canada Highway downtown and was built to accommodate wood truck traffic to the mill.

The proposed site falls within the municipal boundary and planning area of Corner Brook consequently it is subject to city regulations.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area (headland to headland @ 33 ft.)	1500+ acres
2. Protected Area (Entire Bay)	Large

3.	Channel Depth	150 ft.
	Harbour Depth	300 ft.
4.	Channel Width (@33ft.)	5000 ft.
	Entrance Width (@33 ft.)	10,000 ft.
5.	Turning Basin Diameter (@ 33 ft.)	5000 ft.

6. Existing Wharfage and Docks:

Four berths belong to Bowaters, three of which are in good condition but it is doubtful if these facilities could be utilizied for the offshore industry. Three wharves belong to Imperial, Irving and Gulf and they are constructed for tanker use and would appear to be of little direct use. Several other public and private wharves exist but they would be of little interest.

Two public wharves exist and these are operated by Western Terminals and C.N. The availability of these wharves to service the offshore industry on a regular basis would have to be investigated. Their physical criteria are as follows:

Western Terminals

Length	600 ft.	covered storage area
Depth	27 ft. - 42 ft.	= 60,000 sq. ft.

C.N. Facilities

Length	600 ft.	covered storage area
Depth	23 ft. - 25 ft.	= 21,000 sq. ft.

7. Ice Restricted Access:

The Humber Arm usually freezes over during the winter. The end of the Humber Arm is covered with harbour ice and pack ice is not usually encountered until reaching the mouth of the Bay of Islands. Corner Brook is navigable on a year round basis and ice breaker assistance can be obtained between January and April.

Sea ice found on Newfoundland's west coast is mainly formed in the Gulf of St. Lawrence however some ice does find its way into the gulf through the Strait of Belle Isle. Usually the gulf can be covered with close pack ice while a lead along the coast remains open. Westerly winds may drive this pack ice on shore and result in congestion for the coastal approaches. This can rapidly reverse itself with offshore winds. With regard to tow-out of production rigs this would have to be scheduled between May to December.

8. Wave Restricted Access:

Waves at the Humber shoals area are estimated to be in the range of 5 to 6 feet. Wave conditions at the mouth of the Bay of Islands are thought to be similar to those experienced in the offshore Gulf of St. Lawrence.

9. Wind Direction and Speed:

The prevailing westerly winds from December through February give average wind speeds of 10 to 20 m.p.h. Wind speeds of 30 to 40 m.p.h. are common with sustained winds up to 55 m.p.h occurring occasionally. Apparently north and north west winds are more common in Corner Brook than the towns of Deer Lake and Stephenville due to topographical effects. Climatological stations at Stephenville and Deer Lake indicate common northeast winds some 10-15% of the time with maximum average wind speed of 13 m.p.h. Gusts up to 60 knots have been recorded and these can cause navigational problems in the arm although this is thought to be infrequent.

10. Fog:

Due to the rather large distance from the coastline Corner Brook does not experience any foggy weather which is common in many eastern Newfoundland communities. The airports at Stephenville and especially Deer Lake do not receive any interference from fog.

11. Currents:

Current measurements have been undertaken in the Humber Arm with reference to the harbour development. These measurements indicate that wind effects dominate the tidal component and the latter can only be clearly observed when the wind speed is very low. Current velocities were recorded as high as 57 cm/sec at the 17 metre depth and 37 cm/sec at the 25 metre depth. These were mainly attributed to wind speed. The tidal current was recorded at 13 cm/sec, 6 cm/sec and 10 cm/sec at depths of 17 metres, 25 metres, and 33 metres respectively. The lower velocity at 25 metre depth was due to metre location in a less dynamic part of the bay. Currents at the mouth of the Humber River varied from 1.1 cm/sec to 68 cm/sec and were of a varied and complex nature. Generally they were of a clockwise nature except at low tide. In summary wind induced currents tend to override tidal and gravitational currents with some set-up at the harbour head due to up-inlet wind force.

12. Tidal Variation:

The amplitude of large tides for the Humber Arm are in the order of 6.1 feet. Tidal measurements for the proposed harbour development indicate tides are of a mixed, mainly semi-diurnal type, with two high and two low tides daily. Tidal variation of such magnitude is not considered significant towards the operation of a supply/service base. With regard to production platforms launching would probably occur on a rising tide otherwise tides of this magnitude are not deemed significant.

13. Seabed Conditions:

Seabed conditions in the Humber Arm are generally comprised of organic silt, silty sand, some gravel, boulders and soft clay layers overlying shale bedrock.

The southern shoals region of the Humber Arm is considered stable, i.e., deposition equals erosion. The morphology of the sand deposits is a combination of river-delta and flood-tidal delta with a sand particle of 0.1 mm to 10 mm. The shoals generally consist of recently deposited, unconsolidated alluvial sands, silts and clays with a cover of organic material and industrial waste. Dense granular soils are found below the consolidated sediments followed by shale bedrock.

Before any development of this area occurs a detailed soils investigation should be completed followed by proper foundation design to provide a stable load bearing foundation. Construction procedures should be set and followed to reduce environmental impact of displacing unconsolidated sediments.

14. Proximity to Drilling/Production Activity:

Corner Brook is located some 700 miles around southern Newfoundland to the Hibernia oil field. It ranks low on a proximity basis for supply/service bases since it is one of the more distant sites. With regard to module fabrication the distance to any assumed potential assembly site within the Province is not nearly as important. Again with concrete platform construction the distance from the drilling site is not deemed that important since it is a one time operation.

15. Foreshore Land Availability:

The existence of foreshore land in Corner Brook is very limited due to topography and industralized areas. Foreshore land can be made available through the proposed Corner Brook Harbour development in the southern shoals area. While there is a potentially large area which could be landfilled the actual area should be kept consistant with requirements. The initial environmental evaluation for the southern shoals development proposed restricted landfill due to the sensitive biological characteristics of the shoals. Consequently the foreshore area would appear available, consistant with the above mentioned report. The foreshore area in conceptual harbour development plans amounted to 50 acres for the intention of the above study. For the purpose of onshore oil related development this is deemed sufficient although some two or three other areas were also looked at in the harbour development study. A detailed soil survey and foundation design study should be conducted before construction of the foreshore land.

16. Industrial Land Availability:

At the present time there is little vacant industrial floor space in the city and only 15 acres of serviced land is readily available for industrial use. However, two new industrial parks are being constructed, i.e., Country Road and Watson's Pond. The first phase of the industrial park scheduled for completion in 1981 will yield some 130 acres. When completed in 1986 which should provide some 170 acres of serviced industrial land and this is thought sufficient for platform and module construction.

The city of Corner Brook predicts enough commercial space is available for the next ten years.

17. Topography (surficial geology):

The geology of the Corner Brook area consists of metamorphosed sedimentary rocks mainly of the cambrian age with some granitic rock. The predominate types within Corner Brook proper and the Humber Arm areas are as follows: shale, sandstone, slate, greywackye, limestone, conglomerate, basic volcanic rock, quartzite and dolomite. Some bog and unsuitable soils may be encountered especially outside the city but these are thought to be of little consequence. Generally speaking there should not be any severe foundation problems provided the proper design and construction procedures are followed. It should be noted slope failures could result with further landfilling along the shoals area and rock slides have occurred on the Corner Brook Harbour arterial due to the very high faces and orientation of the beding planes within the rock. These problems are of a specific nature and could be avoided or overcome with proper application.

A source of aggregates, near Brakes Cove from a gravel pit are reported to be near depletion. It would appear an alternative source may be available near Hughes Brook but this bears further investigation.

Physical and Social Infrastructure

18. Water Supply:

The current capacity of the Corner Brook water supply system is some 68,190 m^3/day with a surplus capacity of 36,368 m^3/day. It would appear the city has enough capacity to meet the peak demands for platform construction estimated at 294 m^3/day. The city has sufficient capacity for a permanent supply/ service base which has been taken @ 50,000 m^3/year but the latter figure depends upon the type of activity. It would be capable of supporting development and production.

In any event it would appear a larger water main would be required along Station Road since the existing main has little additional capacity.

19. Power Supply:

Corner Brook is connected to the provincial power grid through an electrical station on Massey Drive. As far as Newfoundland and Labrador Hydro are concerned this power if required could be available immediately with low capital cost and minimum upgrading. Upgrading of the distribution line may be required.

20. Sewage Disposal:

As present sewage disposal facilities do not exist on site. These would have to be installed and the concensus to date appears to have a separated system from that controlled by the municipal government. As with the above, storm sewers are not available and these would have to be constructed taking existing water courses into consideration.

21. Solid Waste Disposal:

As far as can be determined solid waste disposal will not be available at or near the site. The City of Corner Brook does have a solid waste disposal site but it is not known if it is for industrial use. However, this is not seen as a major problem because existing industries appear to have solved the problem.

22. Housing:

The number of new families moving into the area or the number of new housing units required would depend upon the length, stability, size of the operation, commutershed characteristics and the number of locals employed who already have acceptable housing.

While the City of Corner Brook has recently stagnated with regard to residential construction it has planned for a large influx of people. Most of the existing housing are single family units with some apartments. The city has 673 new lots which could be made available on short notice. Another 5500 new single family detached housing lots are located in potential subdivisions. In the last few years the community of Pasadena has grown rapidly and since it serves Corner Brook as a dormitory it should be able to provide housing as well.

23. Schools:

There are 14 primary and 8 high schools in Corner Brook. The present student population of 6950 has been expected to expand to 7800 to 8300 within the next five years. As a result of presently declining enrollment, planned expansion has been shelved but can be re-activated if enrollment increases.

24. Vocational Schools:

The district vocational school in Corner Brook has a present enrollment of 508 students. It would appear the majority of these are enrolled in commercial studies as opposed to industrial activity. The regional college seems to be growing and this may be a source of qualified people as well. Generally speaking the vocational school does not offer enough industrially orientated courses.

25. Access to Medical Facilities:

Corner Brook has access to a large regional hospital. The staff consists of 53 physicians, 8 dentists, with 7 public health nurses. The hospital contains some 263 beds with some half-dozen specialized services. Ambulance service is provided.

26. Transport Systems:

Corner Brook has three connections to the Trans Canada Highway with a fourth coming on stream. The new most western access will connect the T.C.H. with the new industrial park and finally with the inner city. The second, Farm Road is for passenger vehicles only and is probably the shortest route into the city. The third access, the arterial road, is the principle trucking route and leads towards the mill. With regard to the proposed development site a new road of some 1½ to 2 km will have to be constructed to obtain an efficient tie in with the Trans Canada and consequently to the industrial park. The four route parallel to the Humber Arm is mainly for use by cars and light trucks.

Corner Brook is connected to the mainland by the rail ferry across the Cabot Strait some 135 miles away. The direct rail line borders the site at Brakes Cove. Scheduled freight shipments are sent direct from Montreal. The city is serviced by two airports, Stephenville and Deer Lake, with regularly scheduled flights by E.P.A. and Air Canada, some 50 and 30 miles distance respectively.

Environmental Preview

29. Natural Environment

The natural environment for this project can be divided into three sections. The first or industrial park is of little concern since it is under construction and partially complete. The second or terrestrial vegetation at Brakes Cove appears to consist mainly of weeds due to commercial/industrial activity and are considered of little value.

The third and by far the most important is the Humber Arm area especially the southern shoals. These shoals are full of marine life and any development will have some impact on the natural environment. The greatest impact would be on the loss of habitat to the fish communities and changes would occur in productivity of eelgrass and pondweed communities. With increasing development, lower salinity is expected and this would reduce the distribution of marine communities especially fishes in the shoals and Wild Cove area. Due to the expected loss of spawning and nursery habitat winter flounder populations are expected to decrease. Loss of backwaters at Brakes Cove and the Humber mouth area will create the same along the edge of the landfill with accruing estuarine communities. It would appear the most important fish found in the shoals is cod but it is not pursued for recreation purposes. Increased currents with lower salinity due to the landfill may wipe out the eelgrass and/or pondweed communities. Consequently the constriction must be eliminated as far as possible and this is a function of size and shape, hence the landfill should be restricted. The above is meant to summarize the consequences on the natural aquatic environment. It is not mean to be conclusive and much greater detail can be obtained in the Corner Brook Harbour Development (IEE) study.

Seabirds and Waterfowl

It should be noted this area is not a waterfowl habitat or seabird sanctuary. However various birds were observed there during the IEE study. There were some 39 different species observed from the common gull and robin to the bald eagle and one pair of ospreys. The ospreys, which are on the endangered species list, were observed feeding in the shoals area. Since there are no large mud flats, large populations of shore birds do not exist. Up to three bald eagles were reported flying over the shoals area up Hughes Brook, these birds are also on the endangered list. Some 30 goldeneyes (ducks) were reported to winter at the mouth of the Humber. Black docks, blue-winged teal and several other species were sighted on single occasions only. The bird fauna consists primarily of forest birds and these assist in keeping control of forest pests. The Humber area is not an important site during bird migrations since migration routes do not occur over western Newfoundland.

Fisheries

The most significant fish species in the Humber Arm and river mouth are as follows: cod, winter flounder, sea trout, eel and tomcod not to mention the very important salmon. These species have commercial and/or recreation value; especially so with salmon. Whales were the only observed marine mammals in the Arm. Several seasonal processing plants are located in Corner Brook processing in excess of 7,000,000 lbs. of fish annually with a 369 manyear effort.

The impact of the proposed development on the aquatic life has been described to some extent in article 29, Natural Environment. One of the main concerns has been the effect on the salmon run which has both a commercial and recreational value. The salmon run appears to concentrate on the central and northern channel in Humber Arm. Consequently little impact is predicted on the salmon run. Unfortunately, an unbiased estimate in the geographic distribution of salmon within the Humber Arm was not possible. However, it is apparent some areas of the arm receive greater utilization in the annual run. Although salmon are usually caught in the surface water layer two salmon were caught in depths of 2 meters. Salmon also prefer clear water and avoid those with high turbidity or pollution, especially the adult salmon.

The Humber River accounted for 7,633 rod-days with 8.6% of the total angling effort for 2909 salmon. The commercial fishery caught some 557 salmon in 1978 for a value of $5000. The impact on salmon from landfill have been stated as follows: 1) changes in the distribution of pollutants carried by surface currents at the west edge of the shoals 2) loss of a portion of the Humber Mouth staging area, and 3) loss of backwater habitat for smelts and kelts at Brakes Cove and the Humber Mouth. The severity of these impacts depends almost entirely upon the shape of the landfill. Concern has been expressed regarding edding undiluted pollutants which may block the salmon run entirely although this is not expected to occur. Predicted change in pollution distribution could force the salmon to spend a longer time in the arm increasing their vulnerability to pollution and commercial fishing. It would appear some questions remain unanswered and these could be predicted by a model analysis and further study. For more detailed information refer to the Corner Brook Harbour study, volume II.

Agriculture

An agriculture development area freeze is proposed. It would extend from Deer Lake, i.e., south of the town of the South Brook - Pasadena area. Due to the rather large distance separating the agriculture freeze and the industrial site no conflict can be forseen. Within the immediate foreshore area adverse topography and the rather dense industrial base would already provide severe constraints on agriculture.

Forestry

Since the industrial park is already under construction and forms part of the Corner Brook industrial strategy it does not concern this report to a great extent. Since most of the foreshore area is to be landfill this will not directly affect the forestry resource. However, the fill to be utilized in foreshore construction could be in a virgin area thus some impact could be felt.

The quarry site has not received final approval consequently it is difficult to determine the impact upon many resources including forestry. Some suggestion has been made at using Prince Edward Park as a source of material. This being the case young trees, shrubs such as dogwood and gooseberry could be destroyed. The park would lose its value as a recreation area and it would have to be relocated elsewhere.

The sawmilling industry in the Corner Brook region contributes some 2.2 mil.fbm of lumber to the Province annually and provides some 74 manyears in employment per year.

Recreation

The land surrounding the proposed development at Brakes Cove is of an highly industralized nature. As such it does offer limited recreation potential since large quarry operations tend to provide aesthetic detractions. However, the Prince Edward Park was proposed as a quarry site in the past and this should be looked at in the long term. Due to the heavy industrial concentration perhaps the park could be relocated.

On the whole Corner Brook has many of the recreation activities of any area its size. The weather is excellent for many summer activities and it is close to many provincial parks and the National Park at Bonne Bay. Winter recreation in Corner Brook with the skiing, hiking and skidoo activities can be a family exercise.

30. Acoustic Change:

Due to the heavy industrial use in the Humber Arm area further development cannot be seen to add to the noise level.

31. Visual Aesthetics:

A major onshore oil related project could have a significant affect on aesthetics. To date little effort has been made to provide an aesthetically pleasing appearance along the Corner Brook waterfront, especially at Brakes Cove. Aesthetic effects can only be predicted when the conceptual design has been completed and it is evaluated,consequently, it is early to predict the same. Aesthetics can be a positive thing for this development providing it forms an integral part of the design. The Corner Brook Harbour Development Study Volume II provides some worthwhile comments in this area.

Social and Economic Considerations

32. Community Services:

Corner Brook is a mature community with many facilities an area of such size can enjoy. Since the community has remained relatively stable,growing pressure has not been exerted on its facilities. Stress on these facilities will depend upon the number of incoming people.

33. Demographic Change:

Given the population base for the Greater Humber Region of 43,649 (1976) and another 10,000 people within Bay St. George area some change will be evident in the community. However, the change will be much less in Corner Brook than several other areas within the Province. Change will be evident in the orientation of the work force from the present pulp and paper industry towards construction. A significant number of people work in the service industry and this is expected to increase with onshore development.

34. Labour Force Characteristics:

In 1978 there were 10,468 tax payers within Corner Brook with an average income of $12,964 per year. The sub-region contained some 14,865 people with an average income of $12,131. Work force statistics for Corner Brook indicate the following trends:

1200-1500 people	- pulp and paper
850	- miscel. industrial/construction
580	- educational
1200	- medical staff
532	- government (provincial & municipal)
2000	- consumer trade
1000	- miscellaneous

Unemployment statistics for January 23, 1981, indicate some 833 women and 2582 men were unemployed. Some 21% (or 500 people) are in the business sector, 35.7% (or 900 people) in construction, 5.7% (144 people) in transportation and some 6.2% (150 people) in machinery and fabricating. It is thought many of these construction workers are normally employed during the summer. Some of these should be available for onshore oil related development. It should be expected that some influx of workers could be expected.

Pre-Conditions for Site Suitability

35. Constraints

- foreshore land of sufficient size for onshore oil related development can only be obtained by landfill.
- any construction by landfilling in the southern shoals area especially, should be designed around the Corner Brook Harbour Development Study with particular regard to the environment and the salmon run.
- it would appear the southern shoals area is the most environmental sensitive within the Arm and further studies including a model analysis should be concluded before any development proceeds, thus answering some of the questions and concerns within volume II of the IEE investigation. Probably another site could be found within the Arm which would reduce potential impacts.
- the Corner Brook Harbour Development Plan would have to be implemented.
- the vocational education system should be improved or channelled towards an industrial base. This should employ more locals and probably create less demand on community facilities.
- construction of a water supply system to the site.

- a study to pinpoint areas within the community which could come under stress from onshore oil development.
- investigation of available docking facilities which could be used regularly,if any, for onshore development.
- location of a quarry for general landfill and source of aggregates with regard to aesthetics.
- proper soil investigation and foundation design before commencing construction especially in the Humber shoals area.
- location of a solid waste disposal site with environmental approach and a primary treatment facility for effluent discharge. Location of storm water effluent to reduce environmental damage.

36. On Site Development Costs

a) Supply Service Base

Wharf	$5,000,000
Extension of Water Main	900,000
Road to site	500,000
Contingencies	400,000
Total	$7,700,000

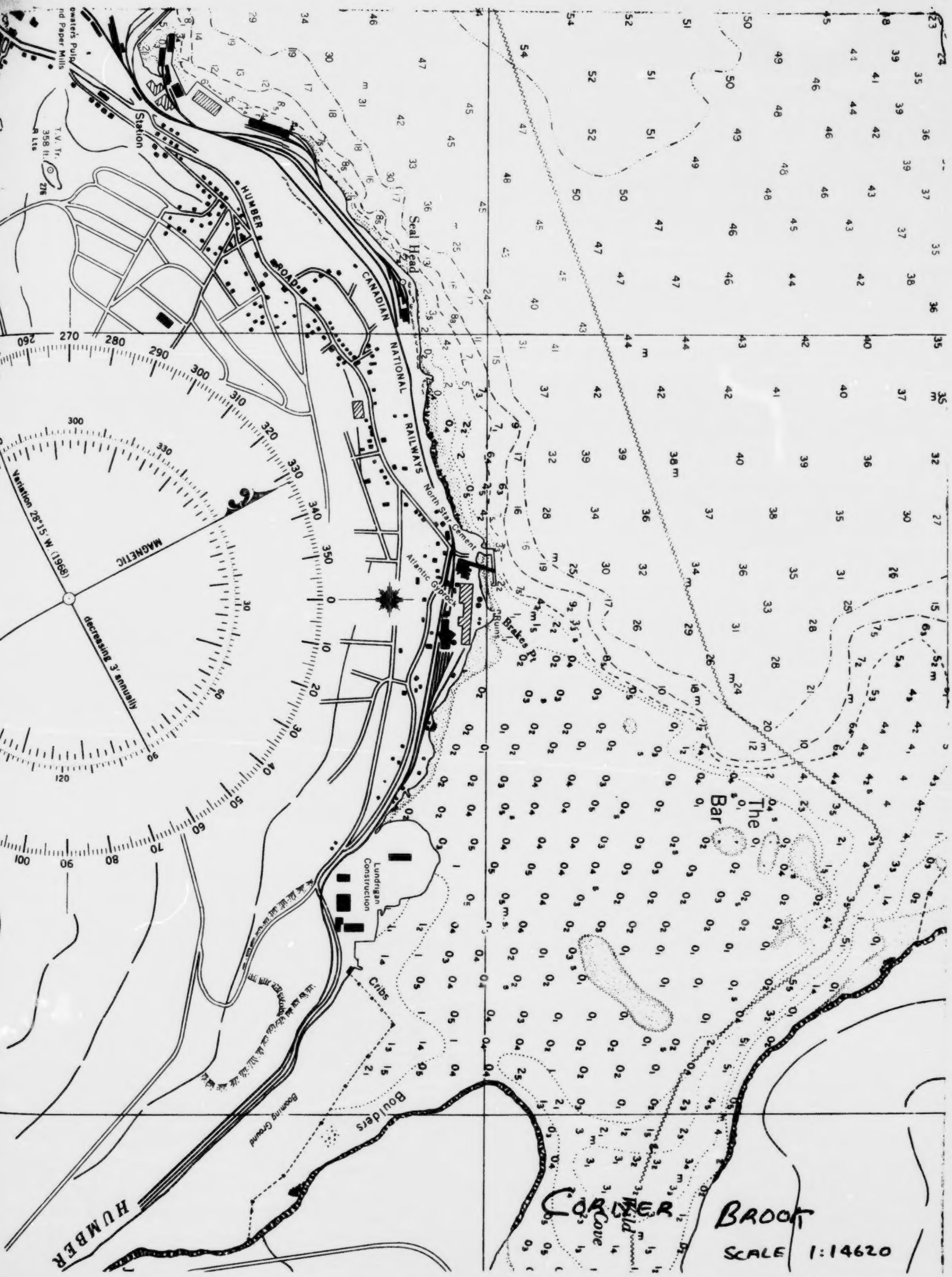
b) Concrete Platform Construction

Wharf	$ 4,200,000
Graving Dock	21,000,000
Extension of Water Main	1,000,000
Road to Site	500,000
Contingencies	1,300,000
Total	$28,000,000

c) Steel Platform Construction

Wharf	$4,200,000
Extension to Water Main	900,000
Road to Site	500,000
Contingencies	300,000
Total	$6,200,000

The construction cost to provide local, social, internal and industrail facilities are extra.


owaters Pulp
nd Paper Mills
Station
T.V. Tr.
358 ft.
R Lts
HUMBER ROAD
CANADIAN NATIONAL RAILWAYS
Seal Head
North Star Cement
Atlantic Gyprock
Ruins
Brakes Pt
The Bar
Lundrigan Construction
Cribs
Boulders
Booming Ground
HUMBER
Cove
MAGNETIC
Variation 28°15' W. (1968)
decreasing 3' annually

CORNER BROOK

SCALE 1:14620

PRELIMINARY EVALUATION
GANDER
AS A LOCATION FOR AN
AIR-RELATED INDUSTRIAL PARK
IN CONJUNCTION WITH
ONSHORE PETROLEUM RELATED DEVELOPMENTS

GANDER

General Description

Gander (pop. 9,301, 1976) is located at the junction of the Trans Canada Highway and the Gander Bay Road approximately half-way between St. John's and Corner Brook. Its "regional" influence probably extends as far west as Glenwood; east as far as Gambo; and around the Gander Bay - Bonavista Loop roads where some 15 incorporated communities are located. Gander serves as the major distribution, transportation and service centre for this area.

Gander has been nominated as a site for air-related industrial activities in support of onshore petroleum related developments which maybe located on the northeast coast of the Province,i.e., Botwood, Lewisporte, Hall's Bay, Main Brook, St. Anthony and the Labrador Coast. It has the only designated international airport in the Province.

Site Description

The site which has been chosen is located within the Town of Gander, adjacent to the international airport and the Canadian National Railway. The site is quite level and appears to have no development constraints except those relating to height of building in certain areas. The site is presently unused and contains approximately 172 ha (430 acres); is owned by the Gander Development Corporation and has been zoned for industrial use.

Description of Harbour, Foreshore and Hinterland - not applicable.

Social and Physical Infrastructure

1. Water Supply:

Gander Lake, the domestic water supply has an unlimited capacity. The existing pumping system is presently capable of delivering 8 mgd against a consumption rate of 1.5 mgd. The cost of extending water services to site is estimated at $3,000 dollars.

2. Power Supply:

Minimal cost associated with extending existing transmission lines to site.

3. Sewage Disposal:

The entire town is serviced. At present the STP is being used to capacity. A second plant recently constructed has improved the situation but additional facilities will be needed over the next five years. The cost of extending the Town system to Phase I of the Industrial Park is $70,000.

4. Solid Waste Disposal:

The town presently uses a landfill site of the Gander Bay Road. Whether or not this site can accommodate industrial waste from the Gander Industrial Park will depend on the volume of waste generated.

5. Housing:

Gander has more than adequate residential land available to accommodate a large population injection. Excess capacity at present is 8,000 lots.

6. Schools:

School enrollments indicate in a general way the size of existing facilities. At present there are five schools with 135 teachers and an enrollment of 1704. All are underutilized and could provide additional capacity for 350-400 students.

7. Vocational Schools:

Gander has a district vocational school. There are few vacancies but ample room available for expansion of facility.

8. Access to Medical Facilities:

Gander has a regional 162 bed hospital with 25 physicians, two public health nurses and an ambulance service.

9. Highway Access:

Road access to Gander by way of the T.C.H. is good. Access to the site however is indirect and rather dangerous. The proposed Gander By-Pass Road recommended in the municipal plan study should be commenced immediately. Estimated cost $ 1.4 million.

10. Rail Access:

The Canadian National Railway passes through a portion of the site and there should be no problems in extending additional spur rails.

11. Airport Access:

Site is located adjacent to the Gander International Airport. The airport has a less than 2% downtime due to weather conditions as opposed to Torbay Airport, St. John's, of 17% downtime.

Environmental Preview

As previously indicated the site is zoned for industrial use and there would appear to be no environmental problems either in terms of land use compatibility, visual aesthetics or acoustic impact.

Social and Economic Considerations

Gander has a wide range of community facilities. In 1976 the population was 9,301 and a labour force population of 3,875. Its catchment area as defined by the federal district of Gander-Twillingate comprises some 76,000 people. Aviation related employment in 1978 accounted for 1,825 of an estimated total labour force population of 5,500. The number of businesses requiring direct airport access and their likely employment levels is unknown. The actual demand for helicopter and fixed wing support ,will depend on location of exploration and development fields, the size of the program and the number of freight and passenger movements. This in turn will affect the number of ground support staff required. The town, however, should be able to absorb a fairly high growth in industrial development without too much strain.

Pre-Conditions for Site Suitability

Cost Estimates: Gander Industrial Park

Phase I

Site Development (55 - 2 acre lots) includes water, sewage and road network	$ 3,400,000
Gander By-Pass 2.8 miles	$ 1,400,000
	$ 4,800,000
Entire Development of the 500 acres	$ 8,500,000

PRELIMINARY EVALUATION
GASTERS BAY
AS A LOCATION FOR
STEEL PLATFORM CONSTRUCTION

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: GASTERS BAY

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR		limited protected	
- cargo wharf 600' at 33'	1050A	3200' wide	suitable
- dock 350' at 40'	60+	breakwater required	"
- Buildup Pier 400' at 40'	400'@60'	Suitable	"
- Assembly Area	400'@120'	Suitable	"
- Tow out min. 40'	100'	Suitable	"
Max. Harbour depth 115' - 130'	200'	Suitable	"
- Waveheight less than 3'	13-15	needs breakwater	unsuitable
2. FORESHORE AREA 20 ha (50 acres)	50+A	suitable (must be dev)	10
3. INDUSTRIAL AREA 60 ha (150 acres)	> 200A	must be developed	5
4. ICE FREE (5% interference)		may require icebreaker	9
5. TRANSPORT NETWORK		req'd	
- highway	poor	local road upgrading	5
- rail	poor	upgrading required	5
- air	St.John's	Torbay Airport(30mi)	7
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools	no excess		0
- vocational schools	Seal Cv.		3
- medical facilities	St.John's		0
- housing		work camps required	0
- power supply		difficult	0
- sewage disposal		needed	0
- solid waste disposal		needed	0
2. WATER SUPPLY		needed	0
3. QUALIFIED LABOUR			
- construction (350)	2735	close to population centre	10
- fabrication (700)	632	close to C.Bay South/ St. John's	6
4. LAND USE COMPATIBILITY			
- fishing		1302 fishermen	4
- forestry		lots of mills with pot.	8
- agriculture		no potential	10
- salmon rivers		nil	10
- wildlife		low risk	9
C. CAPITAL COST			

GASTERS BAY

(Harbour Main - Avondale) Development Area

General Description

The site proposed for development is on the western half of the Harbour Main Peninsula, its water frontage is on Gasters Bay. Most of the southern shoreline rises steeply from the water. Flatter land with water access is located in the northern portion of the 148 hectare site. The site is approximately 30 miles from St. John's.

Gasters Bay is one of the three development areas proposed for the Conception Bay North Shore, along with Bay Roberts and Harbour Grace. It is located in a region with a substantial population and labour force in over 20 settlements. The southern parts of the region in which Gasters Bay is located is near enough to the St. John's area to permit commuting.

Gasters Bay has been nominated for steel platform fabrication, adjacent land to the development site is vacant except for the corner of the site nearest the settlement of Harbour Main. The site is well buffered from most adjacent occupancies. Existing road access is poor from the Avondale - T.C.H. link, the Conception Bay Highway, to the local road through Harbour Main settlement.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area (headland to headland) 33 ft. draft	0 acres Breakwater required

2.	Protected Area (Entire Bay)	1050 acres
3.	Requirements for Cargo Wharf Depth 33 ft., length 600 ft.	Channel width 3200 ft. Channel Entrance 3900 ft.
	Requirements for Dock or Slipway	
	Depth = 50 ft.	60+ ft.
	Width = 200 ft.	200+ ft.
	Length = 300 ft.	300+ ft.
	Requirements for Launch pier	
	Depth = 50 ft.	60 ft.
	Length = 400 ft.	400 ft.
	Requirements for Assembly pier	
	Depth = 120 ft.	120 ft.
	Length = 400 ft.	400 ft.
	Requirements for Tow-out	
	Min. Draft - 40 ft.	100 ft.
	Max. Harbour Depth 115-130 ft.	180 ft.
	Min. Harbour Width - 1000 ft.	1000 ft.
4.	Channel Depth	100 ft.
	Harbour Depth	180 ft.
	Wharf Depth	35 - 80 ft.
5.	Channel Width	3200 ft.
	Approach Entrance	3900 ft.
6.	Turning Basin @ 33 ft.	1000 ft.
7.	Existing Wharfage and Docks	none

8. Ice Restricted Access:

Ice may occur in Conception Bay between mid January and March and clear between mid March to April 20. Duration of ice presence is normally short. Based on statistics for the period 1960-1980 the mean annual duration of ice of 1/10 or greater concentration is 18 days. In Conception Bay, dense drift ice can occur if there is a general trend for pack ice to remain close to shore (NNE prevailing winds) which may require an ice breaker to allow for ship passage.

9. Wave Restricted Access:

The height of waves in Gasters Bay would range probably from 13-15 ft. A breakwater would be imperative to protect the harbour area.

10. Wind Direction and Speed:

Westerly winds prevail. Gale force winds (57.5 to 101 km/hr.) occur 5 to 6% of the time.

11. Fog:

Fog occurs May, June and July. Sea fog type as opposed to inshore fog.

12. Proximity to Drilling/Production Activity:

Not important.

13. Land Availability Foreshore: (requirement 50 acres)

Sufficient relatively flat land available for development.

14. Industrial Land Availability:

Available but must be developed.

15. Topography:

Mostly grasses, shrubs and coniferous trees. Overburden most likely unusable. Overlying bedrock. About 50% rolling and sloping land, the remaining 50% considered hilly and mountainous.

Physical and Social Infrastructure

16. Water Supply: - none

17. Power Supply: - (5-8 megawatts) can be made available.

18. Sewage Disposal: - none

19. Solid Waste Disposal: - separate facility required.

20. Housing:

The subregion is unlikely to be able to accommodate large labour force required at site (1000+ for 3 semi-submersibles). Work camp would be required.

21. Schools:

There are four schools in the Harbour Main, Avondale area employing 55 teachers with an enrollment of 1050 students. There is no excess capacity available.

22. Vocational Schools:

Access to Seal Cove Vocational School (10 miles) and Carbonear (35 miles).

23. Access to Medical Facilities:

St. John's (30 miles), Carbonear (35 miles).

24. Highway Access:

Existing road access is poor, from Avondale - T.C.H. link, the congested Conception Bay Highway, to local road through Harbour Main settlement.

25. Rail Access:

The C.N. Rail branch line runs up the shore from Holyrood to Carbonear. The line is little used and is unlikely to provide an alternative transportation route for heavy materials.

26. Airport Access: - St. John's, 30 miles east.

Environmental Preview

There are no salmon rivers and no calving or wintering areas for moose or caribou.

Fisheries

In 1980, within a 30 mile radius there were 767 boats, 1302 fishermen and a landed catch of 94.5 million lbs. with a landed value of 9.8 million dollars. There is one squid processing operation in Harbour Main.

Forestry

There are 36 small sawmilling operations in the catchment area with an annual production of 1,045,000 fbm and an estimated manyear effort of 34 years.

Agriculture

Site area is unsuitable for agriculture because of topography. There may however be small pockets of land in the surrounding area of site suitable for farming. Site is not in conflict with agriculture development areas.

Recreation

The area has a moderate priority for recreational use.

Social and Economic Considerations

Gasters Bay is situated to take advantage of the substantial population and labour foce of the Conception Bay North Shore. Land transportation to the development area and residential accommodation for a fabrication yard at Gasters Bay would pose major difficulties in site development. Neither Avondale nor Harbour Main have established planning areas or exercise development control. The development area lies within the Harbour Main municipal boundary.

Depending on the nature of the activities construction and operation of a fabrication yard in the northeast corner of the site would cause problems to residents in the immediate area.

The large labour force required at peak level operation on site (1000+ for 3 semi-submersibles) would require a large and fluctuating amount of accommodation. The subregion (population 6000+ in 1976), (Sub-Division 10 - Head of Conception Bay, Avondale, Colliers, Conception Harbour, Harbour Main, Holyrood and unorganized = 6,408) is semi-rural and is unlikely to be able to accommodate sudden and temporary influxes of workers. As such a work camp would be required.

Physical constraints re topography would hamper development. The wharf will require some degree of protection and in order to achieve good material protection and deep water the dock facility would have its back against a cliff.

While Gasters Bay has suitable physical characteristics and access to a large labour pool it is limited in every other way.

Pre-Conditions for Site Suitability

Breakwater wharf 200 m x 10 m x 16 m = 32000 C.M.

32000c.m @\$200/m^3 =\$6,400,000

Marginal wharf 100 m x 60 m @\$21,000/L.M.=\$2,100,000

Total Marine \$ 8,500,000

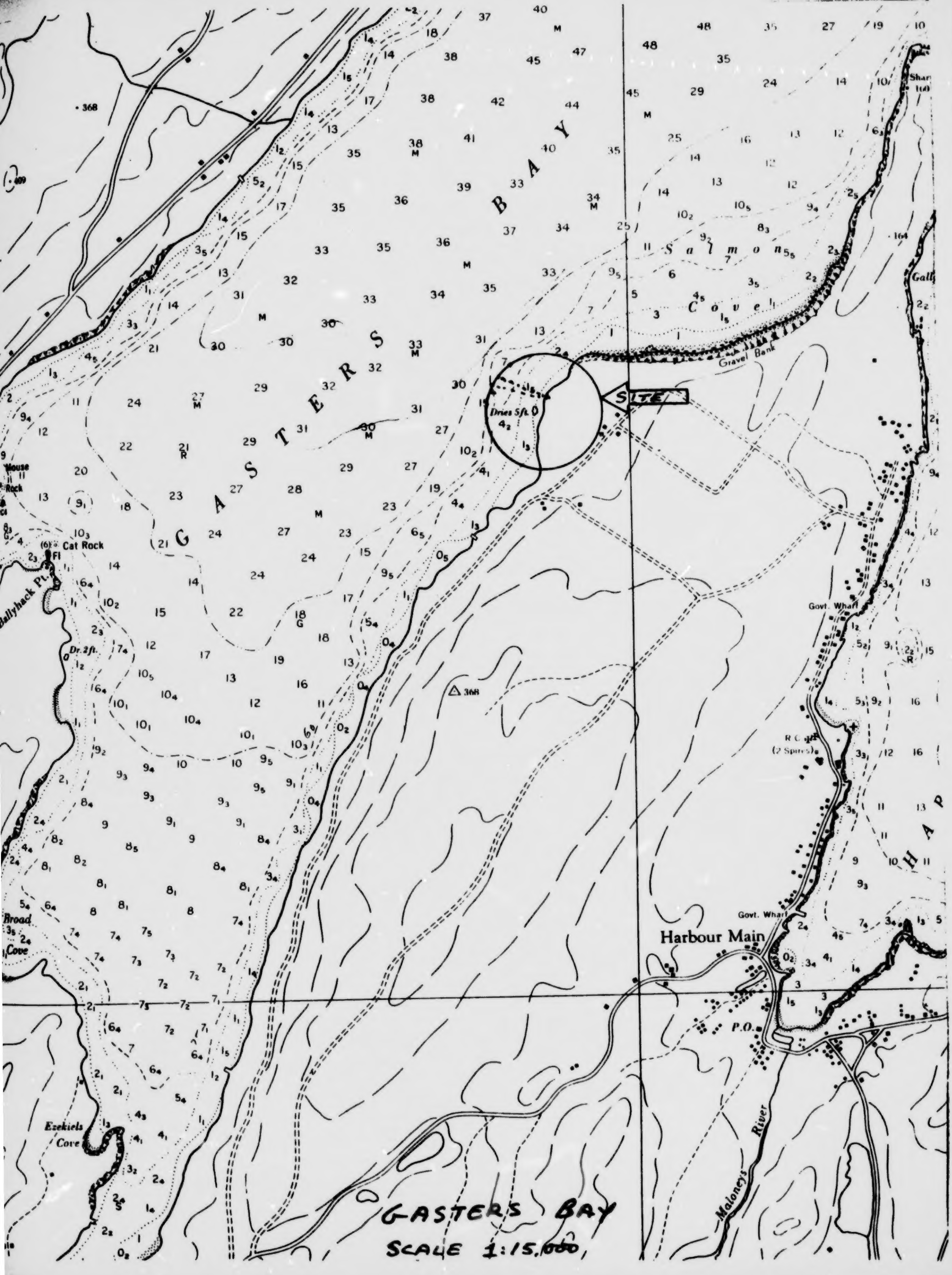
Foreshore and Industrial Area \$ 1,500,000

Access Road 3.0 km @\$250 \$ 750,000

Water System (Leer pond) 5 km @\$350/m = \$1,750,000

Total = \$12.5 million

The costs for social and local services in addition to internal industrial facilties will be extra.


G A S T E R S   B A Y
S a l m o n   C o v e
Gravel Bank
SITE
Dries 5ft.
Mouse Rock
Cat Rock
Fl
Ballyhack Pt.
Dr. 2ft.
Broad Cove
Ezekiels Cove
Harbour Main
Govt. Wharf
Govt. Wharf
R.C. Ch. (2 Spires)
P.O.
Maloneys River
H A P
368
368

GASTERS BAY
SCALE 1:15,000

PRELIMINARY EVALUATION
GOOSE BAY, BONAVISTA BAY
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

ocation: GOOSE BAY, BONAVISTA BAY

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	1068A	48' deep	
- waveheight (<3 ft.)	< 3'	available	
- cargo wharf 33' draft (500 ft.)		"	
- supply wharf 20' (900 ft.)		"	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	120'	"	
- channel width (800 ft.)	4900'	"	
- approach depth (33 ft.)	6000'	"	
- turning basin (1000 ft.)	7200'	"	
FORESHORE AREA (20 A)	-	attainable	
INDUSTRIAL AREA (200 A)	200A	needs development	
ICE FREE (5% interference)	340 days	possible problem 20 days	
PROXIMITY TO DEVELOPMENT	300 mi		7
TRANSPORT NETWORK			
- highway		20 miles to upgrade,bridge problems	5
- rail		needs upgrading, spur	5
- air		nearest Gander 70 mi	3
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools (200 vac.)	500-700	excess capacity	10
- vocational schools	none	Clarenville, Bonavista	3
- medical facilities	clinic	planned Clarenville Hosp.	3(10 in'8
- housing		nothing developed	0
- power supply		needs work	5
- sewage disposal		must be developed	0
- solid waste disposal		must be developed	0
WATER SUPPLY		must be developed	0
QUALIFIED LABOUR		Total labour 6500	10
- construction (200)		524 construction	
- fabrication (100)		60 fabrication	6
LAND USE COMPATIBILITY			
- fishing		no major industry	9
- forestry		sawmills	2
- agriculture		some potential	5
- salmon rivers			10
- wildlife			4
CAPITAL COST			

GOOSE BAY, BONAVISTA BAY

General Description

Goose Bay is an inlet on the north shore of the Bonavista Peninsula in the southwest bottom of Bonavista Bay. The western shore is comprised of the settlements of Musgravetown, Bloomfield and Cannings Cove. Bloomfield and Lethbridge occupy the head of the Bay. The eastern shore is more sparsely settled, with communities of Brooklyn, Portland, Jamestown and Winterbrook. In the area from Port Blandford in the west to Winterbrook in the east there is a combined population of 4,400 (1976 census).

The Cabot Highway, route 230, linking Clarenville and Bonavista, passes through Lethbridge at the head of the Bay. Clarenville, the region's shopping and service centre is 30 km to the south. Within commuting distance of the Bay there is a population of over 23,000 (1976) and a labour force of 5,780 (1976).

Goose Bay has been nominated as a site for an offshore supply/service Base. It is located 70 miles north of Gander International Airport and 135 miles northwest of St. John's.

Description of Harbour, Foreshore and Hinterland

1. Protected Area (headland to headland) at 33 ft. draft	1060 acres
2. Semi-Protected Area (Entire Bay)	Large

3.	Channel Depth	120 ft.
	Harbour Depth	48 ft.
4.	Channel Width (33 ft.)	4900 ft.
	Approach Entrance (33 ft.)	6000 ft.
5.	Turning Basin at 33 ft.	7200 ft.
6.	Existing Wharfage and Docks	none

7. Ice Restricted Access:

The shipping season is usually year round with some drift ice in the vicinity during March and April. Severe winter (every 5-6 years) cause freezing of the harbour from mid January to early March. Ice thickness rarely exceeds 12 to 15 inches. On average the entrance to Bonavista Bay will be blocked by ice of 1/10 or greater concentration for 55 days per year and during severe winters for 125 days. An ice strengthened supply vessel could navigate into the bay on 60-70% of these days.

8. Wave Restricted Access:

Goose Bay is well sheltered from waves in any direction. Estimated wave heights near Jamestown site, 5-6 ft.

9. Wind Direction and Speed:

Westerly winds prevail (W,WSW,WNW) with shifts in direction due to storms or low pressure ridges. Maximum average wind speed is approximately 25 m.p.h. The maximum observed hourly speed 70 m.p.h. with gust to 102 m.p.h.

10. Fog:

The area is considered to be fog free on a year round basis.

11. Currents: Information not available.

12. Tidal Variation: 4.6 ft.

13. Seabed Conditions:

Probably rock. Anchorage available.

14. Proximity to Drilling/Production Activity: - 300 miles.

15. Land Availability Foreshore:

There may be sufficient land in the Jamestown area which is generally better for development since there is more level land. The 20 acre backup may have to somewhat linear.

16. Industrial Land Availability:

A 250 acre industrial area is probably available and would require development and a good road access to base.

17. Topography:

The area is generally hilly in the southern portion and more level in the northern side. Coniferous and deciduous trees and grasses form the vegetation cover on the entire area. Boulders are present and there are areas of bog and/or unsuitable soils, but these are probably of shallow depth.

Physical and Social Infrastructure

18. Water Supply - none

19. Power Supply - could be made available.

20. Sewage Disposal - none

21. Solid Waste Disposal:

Separate landfill site required of approximately 20 acres.

22. Housing:

There are no proposed residential areas in the subregion and the level of infill land available for residential development is probably limited in the area.

23. Schools:

There are six schools in the subregion with 156 teachers and an enrollment of 2,200. All are underutilized and have additional capacity for 500-700 students.

24. Vocational Schools:

The nearest vocational schools are at Clarenville 30 miles south and Bonavista 40 miles north.

25. Access to Medical Facilities:

There are two clinics in Musgravetown and two physicians. Nearest hospital facilities are at Bonavista 40 miles away or Gander (70 miles). Clarenville is to have a new hospital constructed in 1982.

26. Highway Access:

Goose Bay is linked to the T.C.H. via route 230, the Cabot Highway, 30 km to the south. The Cabot Highway is in a deplorable condition and will have to be upgraded as well as the gravel road upgraded between Lethbridge and Jamestown. Costs would average $250 - $300,000/km.

27. Rail Access:

The nearest rail access is Port Blandford or the C.N.R. Bonavista Branch line via Lethbridge which may not be suitable as an alternative transport mode given its present condition and load capacity. An alternative would be a spur line from Port Blandford to Goose Bay.

28. Airport Access:

The nearest airport is Gander International - 70 miles south.

Environmental Preview

29. Natural Environment:

The contribution of fish to the total Newfoundland catch by anglers in the Goose Bay area is negligible. There is only one salmon river in the area, Southern Bay River. There are no calving or wintering areas for moose or caribou within a 36 miles^2 management zone of site. Terrestrial wildlife would not be directly effected by development.

Seabirds and Waterfowl

While there are several varieties of seabirds in all coastal regions there are no seabird sanctuaries in the area.

Forestry

The Goose Bay area is heavily forested with a high quality high yield forest resource. There is a substantial degree of forest related activities, especially sawmilling operations; 5000 cords of pulpwood in the form of salvage from sawmill residue are exported from the general area. There are approximately 247 sawmilling operations with a total production of 5,728,000 f.b.m. and a manyear effort of 190 people.

Agriculture

There is potential conflict between the proposed development site and a proposed agricultural development area. This area includes a small zone (c) immediately north of Musgravetown, zone B southwest of Musgravetown and a large area zone A at the head of Goose Bay.

Fishery

Fishing effort within a 38 mile radius of Goose Bay is moderate. 1979 figures show a total of 509 fishermen (72 manyears) 308 licenced inshore boats with total landings of 12.8 million lbs. and a landed value of 1.4 million dollars. There are two fish processing operations both in Clarenville with a manyear effort of 21 people.

Recreation

The harbour of Clode Sound forms the southern boundary of Terra Nova National Park, operated by Parks Canada which has high tourist potential.

30. Acoustic Impact:

Could be significant given close approximation of residents to site area.

31. Visual Impact:

Could also be significant.

Social and Economic Considerations

32. Demographic Change:

There is a population of over 23,000 (1976) within commuting distance of the site. Any population increase would most likely be spread and have minimal impact.

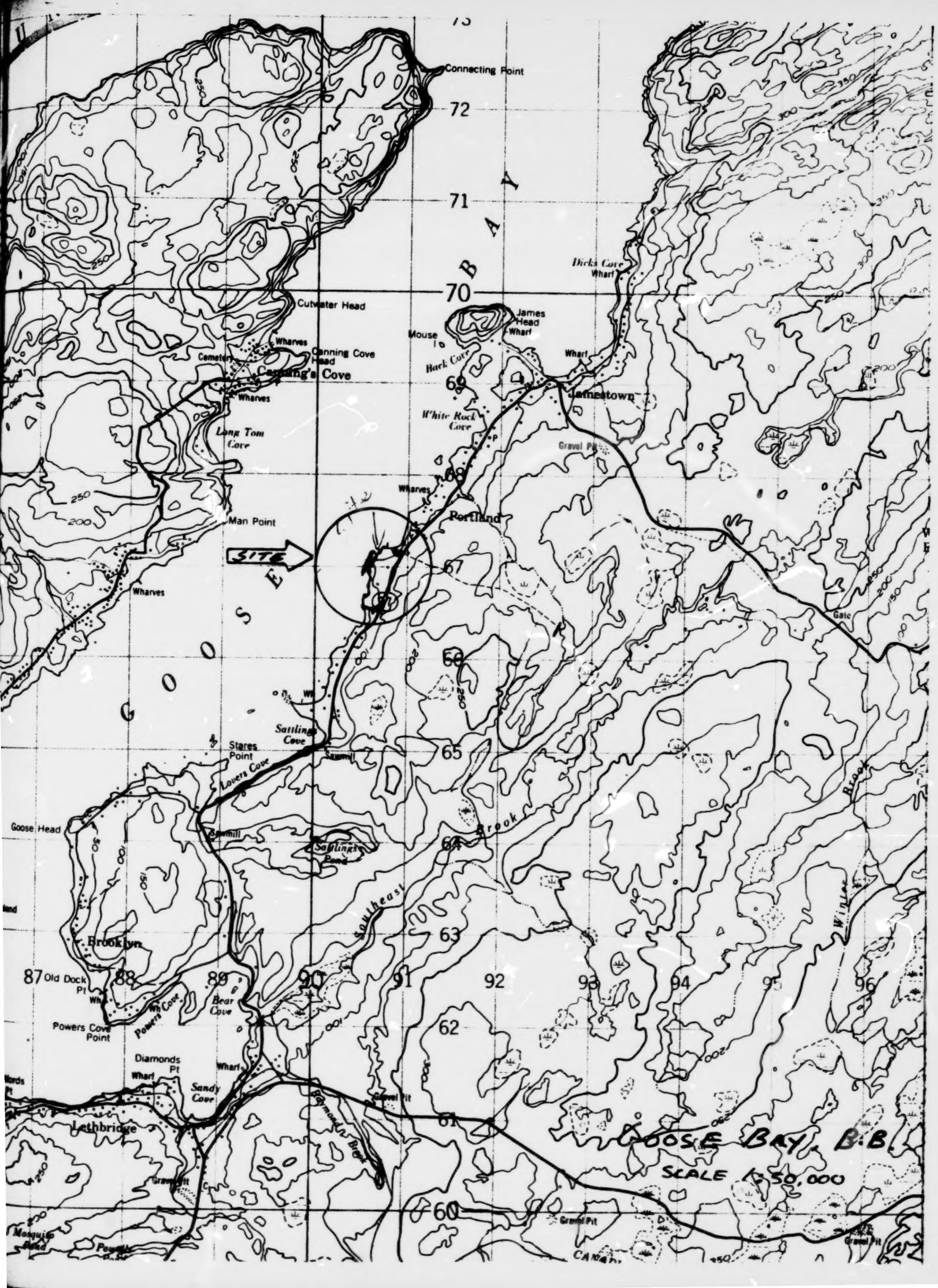
33. Labour Force Characteristics:

Within commuting distance there is a labour force population of 5,780(1976). Unemployment figures for January, 1981, showed an unemployed labour force of 1,323 of which 37.6% (524) were listed as construction workers, 4.5% (60) as machinery and fabrication and 6.6% as transport equipment and material handling with the remainder split amongst other occupations. Labour supply is moderate to demand.

Pre-Requisites for Site Development

- wharf	$ 3,500,000
- site preparation	750,000
- water system	800,000
- upgrading of Cabot Highway	10,500,000
- upgrading of road from Route 320 to site (including bridge)	2,750,000
- contingencies	950,000
Total	$19,250,000

The cost of internal servicing for the industrial area must be added to the above.


Connecting Point
Cutwater Head
Wharves
Canning Cove Head
Cemetery
Canning's Cove
Wharves
Long Tom Cove
Man Point
Wharves
James Head
Wharf
Mouse I
Back Cove
Wharf
Jamestown
White Rock Cove
Gravel Pit
Wharves
Portland
Dicks Cove Wharf
GOOSE BAY
Saltlings Cove
Sawmill
Stares Point
Lovers Cove
Goose Head
Sawmill
Saltlings Pond
Southeast Brook
Brooklyn
Old Dock Pt
Powers Cove
Powers Cove Point
Bear Cove
Diamonds Pt
Wharf
Wharf
Sandy Cove
Lethbridge
Raymond Brook
Gravel Pit
Gravel Pit
Gravel Pit
Gravel Pit
Gate
Winter Brook
Mosquito Pond
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SITE

GOOSE BAY, B.B.

SCALE 1:50,000

PRELIMINARY EVALUATION
HALL'S BAY
AS A LOCATION FOR
a) CONCRETE PLATFORM CONSTRUCTION
b) STEEL PLATFORM CONSTRUCTION

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: HALL'S BAY

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			
- cargo wharf 500' at 33'	5000 A	Available	
- Dock 650'X650' at 33'		attainable	
channel width 800'	4500'		
- Buildup Site 800' at 260'	2000'@ 300'	available	
- Tow-out Base			
min depth 425', min width 200'	600'/2980'	available	
- Wave height, 3'			
- Deep Sink 800'wide @660'	1200'@660'		
2. FORESHORE AREA (50 A)	50+A	attainable	
3. INDUSTRIAL AREA (150A)	125A	to be prepared by excavation	
4. TRANSPORT NETWORK			
- highway		near T.C.H.	10
- rail		Badger near jnct.	5
- air	Deer Lk.	gravel strip nr. site	2
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools	300+vac.	excess capacity	8
- vocational schools		3 local schools	7
- medical facilities	cot.hosp.	Grand Falls for major hosp.	5
- housing (200)	50+		3
- power supply		excess capacity	10
- sewage disposal		need to dev.at site	0
- solid waste disposal		excess cap.in comm.	10
2. WATER SUPPLY		supply from South Pond needed	0
3. QUALIFIED LABOUR		Labour pool 2209	6
- construction		389 construction	
- fabrication		42 fabrication	1
4. LAND USE COMPATIBILITY		nearest fish plant	
- fishing		LaScie	10
- forestry		few mills with good pot.	6
- agriculture		area with designated	
- salmon rivers		potential	0
- wildlife		river near site	7
C. CAPITAL COSTS			10

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: HALL'S BAY

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR			Critical
- cargo wharf 600' at 33'	5000A	Available	
- dock 350' at 40'	50+'	attainable	
- Buildup Pier 400' at 40'	50+'	attainable	
- Assembly Area			
- Tow out min. 40'	600'	available	
Harbour depth 115' - 130'	180'	available	
- Waveheight less than 3'	<3	available	
2. FORESHORE AREA 20 ha (50 acres)		attainable	
3. INDUSTRIAL AREA 60 ha (150 acres)		attainable	
4. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE		Same as Concrete Platform Construction	
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR			
- construction			
- fabrication			
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COST			

HALLS BAY

General Description

Hall's Bay is a relatively wide winding inlet of the sea located in the southwest corner of Notre Dame Bay on the north coast of the Island. The Bay runs inland in a southwesterly direction for about 35 km from its entrance at Gull rock. The shoreline in the outer portion of the Bay tends to be steep and densely wooded while toward the head of the Bay the land assumes a more gently rolling nature.

The proposed site is located at the extreme head of the Bay, bounded on the west by Riverhead Brook, on the east by Wolf Cove Head and on the south by the Trans Canada Highway. It is approximately 50 hectares in area and is crossed by two brooks.

The town of South Brook with a population of 828 in 1976 lies about 3 km to the east of the site. Springdale, the regional centre for the area, with a population of approximately 3,600 is located on the west side of Hall's Bay about 19 road km away. In 1976 the total Hall's Bay region had a population of 9,137.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	5000 acres
2.	Protected Area (Entire Bay)	
3.	Channel Depths	600 ft.
	Harbour Depth	600 ft.

4. Channel Widths 3000 ft.

5. Turning Basin

6. Existing Wharfage and Docks:

There are no existing facilities at the Hall's Bay site. The closest port facilities in the area exists at Springdale where the local wharf has recently been upgraded. This wharf is used on a weekly basis during the summer season by C.N. Marine coastal services and by a small number of fishing vessels.

7. Ice Restricted Access:

Access by sea on a year round basis is not considered practicable as the Bay is frozen to a thickness of approximately 90 cm between January and April. Pack ice and icebergs in approaches are also common from January to June.

8. Wave Restricted Access:

The maximum wave height at the site is predicted to be 2.7 metres and the 20 year storm surge 0.5 metres. Local knowledge and physical evidence suggests that ocean waves are not expected to penetrate to the site. It is important to relate the predicted wave heights for the site with actual conditions by establishing long term observations of wave conditions.

9. Wind Direction and Speed:

Wind occurs in the area from a predominantly southwest/

northwest direction. The average wind speeds throughout the year are known to be 20 km/hr. in January and 15 km/hr. in July. The probable maximum wind speed for the area is estimated at 110 km/hr. from the southwest.

10. Fog:

The annual incidence of fog in the area is approximately 80 days.

11. Currents:

Maximum tidal range at Springdale, 8 km from the site, is documented at 1.4 metres.

Current profiling of the Bay has never been conducted but geological evidence of shoreline modification and sedimentation appear to indicate the existence of a general counter-clockwise current. It is imperative that current profiling be conducted along the full length of the Bay before tows of production facilities is undertaken.

12. Tidal Variation:

Tidal range is 4.8 ft.

13. Seabed Conditions:

The seabed at the site is anticipated to consist of moderately thick deposits of fine grained soil but this has not been confirmed. Bottom sampling is therefore required.

14. Proximity to Drilling/Production Activity: -

15. Land Availability Foreshore:

The entire site area is located in granular soils and is relatively level.

16. Industrial Land Availability:

The plan for the site shows a total area of about 50 hectares. This would be created entirely by the excavation of some 1,150,000 cubic metres of mostly granular material and its disposal as fill.

17. Topography (surficial geology):

The topography is flat to gently rolling. Soils consist of an extensive deltaic outwash deposit underlain by well graded sand and gravel to an estimated depth of at least 50 metres. Much of the site and its surrounding area is covered by coniferous tree stands characteristic of the region.

Physical and Social Infrastructure

18. Water Supply:

There is no water system in place at the proposed site. South Brook, the closest town receives its water from South Pond which should have adequate capacity to accommodate the site. Located to the southwest is West Pond which also appears to have a very large capacity, although it will have to be determined which water source should be extended to the site.

19. Power Supply;

At present Newfoundland and Labrador Hydro supply power to the Hall's Bay area. There is a 20 KV distribution line running by the site and a 138 KV transmission line only about one mile away. This transmission line can take 40 or 50 megawatts of power.

20. Sewage Disposal:

South Brook has a piped sewage disposal system. However, it is unlikely that it would be feasible to pump sewage from the site into the South Brook system. It is assumed that sewage from the site would best be piped, possibly via septic tanks, into Hall's Bay.

21. Solid Waste Disposal:

There are two existing dump sites in the area. The Springdale facility, about 16 km from the site, operates on a combination of incineration and landfill. It is reported to have a large capacity for expansion. The South Brook facility is about 10 km from the site on the Roberts Arm Road, It also has a large capacity for expansion.

22. Housing:

It has been proposed that an "on site" construction camp be established to accommodate the workers required for the development. This camp could also be constructed elsewhere, with a bussing system to the site.

In the nearby communities of South Brook and Springdale there is little or no vacant housing. However, a few housing lots are available in South Brook. In Springdale, the NLHC subdivision on Little Bay Road contains close to fifty lots which could be developed within a short time.

23. Schools:

There are two school boards operating in South Brook and Springdale; the Green Bay Integrated and Pentecostal Assemblies Boards. South Brook has 2 elementary schools with a combined enrollment of 147 in 1980. Springdale has 2 high schools, 2 elementary schools and 1 primary school with a combined enrollment of 1216 in 1980. Enrollment has declined slightly in both communities during the past couple of years making it possible to accommodate some extra pupils.

24. Vocational Schools:

There are three vocational schools in the greater Hall's Bay region; at Springdale, Baie Verte and Grand Falls. The Springdale school has a present enrollment of approximately 100 and has the space for considerable expansion.

25. Access to Medical Facilities:

A provincial government cottage hospital serves the Town of Springdale and the region. The hospital has 41 beds and is staffed with 4 doctors and 10 nurses. Emergency and critical cases beyond local capabilities are sent to a major hospital in either Corner Brook or Grand Falls. There are two dentists serving the region.

26. Highway Access:

The site is bounded by the two lane Trans Canada Highway. There is also a gravel road leading westward from the main site around the bottom of the Bay. The towns of South Brook and Springdale have adequate paved road systems but the roads are narrow and the linear nature of the settlements tend to create high traffic density on the main streets.

27. Rail Access:

The nearest rail junction is at Badger, approximately 48 miles by road. Loading and storage facilities at this location is severely limited.

28. Airport Access:

The closest airport is at Deer Lake, 82 miles away by road. A small 2000 ft. gravel airstrip maintained by the provincial government is located close to the site.

Environmental Preview

29. Natural Environment:

A major concern at the Hall's Bay site is that the proposed development might adversely affect the salmon runs in the Indian, West and South Brook rivers. The salmon is very sensitive to changes in water chemistry and quality. This can be of serious importance in Hall's Bay during the peak of the salmon run in July.

Seabirds and Waterfowl

Waterfowl, eider ducks and a variety of other ducks are found in the Hall's Bay area. Some eiders are known to overwinter in the open water on the tidal flat at the mouth of West Brook. If this is a crtical wintering area for the eiders then precautions will have to be taken to ensure that the flock is protected.

Fisheries

Hall's Bay does not support a large fishery, groundfish or otherwise. Springdale is the centre of the industry and is entirely an inshore operation. In 1975 only 6000 lbs. of cod were landed in the town. The nearest fish plant is at LaScie, some 96 km away.

Agriculture

The west side of Hall's Bay has moderate priority for agriculture and the bottom of the Bay lies at the centre of an area marked for "medium production emphasis".

Forestry

The site is on the boundary beteen Canada Land Inventory classes 5 and 6; productivity ranging from 11 to 50 cubic feet per acre per year. These rate as a low (class 5) and a moderate (class 6) capability for forestry.

Recreation

The area has a low capability for recreation at present.

A camping site located eastward along Hall's Bay at Goodyear's Cove is the only popular recreation attraction in the area.

30. Acoustic Change:

Noise levels will rise in the area particularly during site construction. However, once the site is operational the noise of passing traffic on the highway will probably exceed that at the site.

31. Visual Aesthetics:

Visual intrusions at Hall's Bay will be unavoidable. The site is adjacent to the Trans Canada Highway and can therefore be overlooked along most of the southwest side. Some precautions may therefore be necessary to allow passing motorists to view the site safely without hampering traffic movement.

Social and Economic Considerations

32. Community Services:

The site has access to many existing community services at the towns of Springdale and South Brook. To support the proposed development the existing infrastructure in the area will require substantial upgrading and additions.

33. Demographic Change:

There is an estimated total population in excess of 10,000 in the Hall's Bay region today. The largest town in the area is Springdale which had a population of 3,513 in 1976. From

1961-1971 the region enjoyed large increases in population, over two-thirds of this increase was experienced in the town of Springdale. Although the trend of growth in Springdale may subside somewhat, it is anticipated that much of the younger population in the area will settle in the town.

34. Labour Force Characteristics:

Traditionally, economic activity in the Hall's Bay area was mainly centered around the forest products industry with fishing playing a secondary role. During the 1950's, mineral exploration began and by the 1960's the region had become one of the major mining areas in the Province. In 1972, due to external factors, mineral exploration ceased and an upsurge in forestry activity lessened the impact this had on the local economy.

Today the forestry sector continues to be a very productive and important employer in the area. Out of a total labour force in 1976 of 2,915, approximately 200 were employed in the woods industry. For the same year 665 were recorded as unemployed, with an average employment rate at 23.9%. The average participation rate was 41.9%.

There is no specific data available on the present distribution of skills among the work force. The major employer continues to be the forest industry with the fishery, ship building and mining being of lesser importance. There is also a small agricultural industry. In recent years Springdale has developed as the major institutional and commercial centre for the region.

Pre-Conditions for Site Suitability

35. Constraints:

- for the work force in the area; a training/upgrading program is needed.
- worker accommodation; the impact of an on site "island" community should be carefully studied, which would meet the needs of the industry and the workers. The major purpose should be to keep the adverse impact on local communities to a minimum.
- the most feasible method of water supply and sewage/solid waste disposal must be determined.
- the ways in which the project could benefit the region in the long term (i.e. after it has been phased out) should be carefully considered. This could be studied from many perspectives, including manpower training, the continued use of infrastructure and services provided the project and the development of offshore industries.
- the possible disruption of existing industries by workers transferring to higher paying jobs on the project through the use of existing skills or through retraining.

36. Facilities Required:

Steel Platform Construction

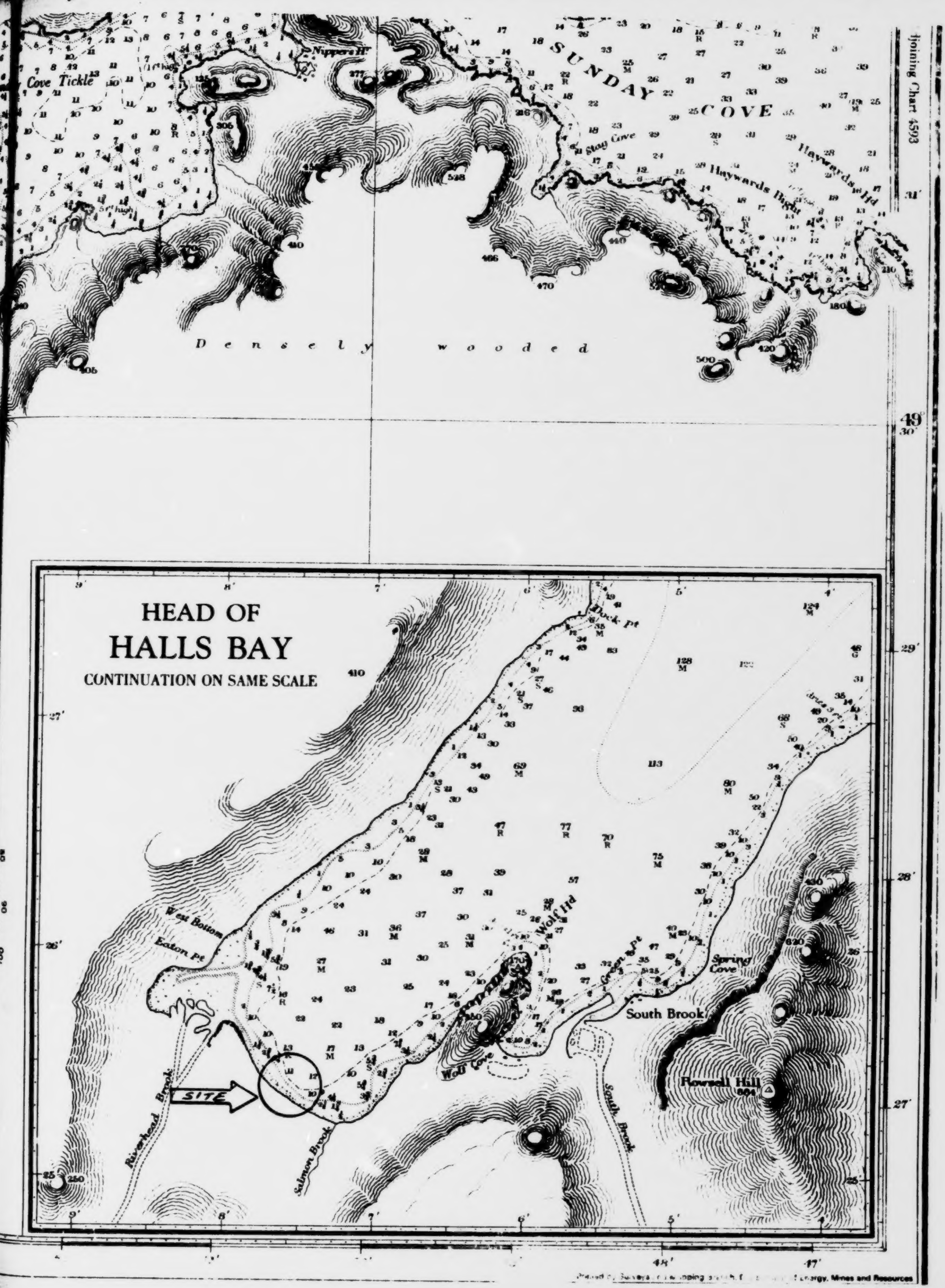
Wharf		$ 3,500,000
Water		1,250,000
Contingencies		150,000
	Total	$ 3,500,000

The cost of developing onshore facilities such as but not limited to site preparation, local roads, internal servicing and related industrial facilities are extra.

Concrete Platform Construction

Graving Dock		$ 21,000,000
Wharf		3,500,000
Water Supply		1,250,000
Contingencies		1,250,000
	Total	$ 27,000,000

Other facilities such as but not limited to site preparation, local roads, internal services and related onshore industrial facilities are extra.


Cove Tickle
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SUNDAY COVE
Stag Cove
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HEAD OF
HALLS BAY
CONTINUATION ON SAME SCALE
Dock Pt
West Bottom
Eaton Pt
Wolf Hd
Green Pt
Spring Cove
South Brook
Wolf Cove
Rowsell Hill
604
Riverhead Brook
Salmon Brook
South Brook
SITE
29'
28'
27'
26'
25'
9'
8'
7'
6'
5'
4'
48'
47'

Printed by Surveys and Mapping Branch, Department of Energy, Mines and Resources

PRELIMINARY EVALUATION
HAPPY VALLEY - GOOSE BAY
AS A LOCATION FOR
AIR-RELATED INDUSTRIAL PARK
IN CONJUNCTION WITH
ONSHORE PETROLEUM RELATED DEVELOPMENTS

HAPPY VALLEY - GOOSE BAY

General Description

Happy Valley - Goose Bay is located in Hamilton Inlet at the western extremity of Lake Melville in Labrador. It is the only large urban centre in the Lake Melville region and possesses much (84%) of the human resources in eastern Labrador. It has an estimated population of 8,700 including 2,200 people living on the south side.

The site proposed for development is the north side of Goose Bay which has been used in the past by the Canadian Government as a part of the "military reserve area". This site is estimated at 28.3 hectares and is substantially developed. Many of the existing structures seem to present no substantial problems to conversion for use of industries related to offshore oil and gas development. At present there are eleven (11) vacant buildings that could be converted for light industrial users or removed for redevelopment. In addition to the serviced land there is an unserviced area north of the proposed site (about 20 ha) which could be developed.

The skills of the local workers are mainly oriented toward the servicing sectors; depending on the nature of industries which might locate in the area. Training would be required to provide the local labour force with the skills needed to capitalize on job opportunities.

Description of Harbour, Foreshore and Hinterland

While it is not envisaged that Happy Valley - Goose Bay will be a supply service base in terms of a marine orientation because of its geographical distance (100-130 miles from coastal Labrador) exploration drilling sites off the Labrador coast it could have a major role in support of the offshore operations from an aviation perspective. Physical information is given though as drill ships have used the port.

1.	Protected Area (headland to headland) 33 ft. draft	400 acres
2.	Semi-Protected Area	Large
3.	Channel Depth (33 ft.)	31 ft.
	Harbour Depth	60 ft.
4.	Channel Width (33 ft.)	0
	(25 ft.)	190 ft.
	Approach Entrance	1300 ft. at Henritta Passage
5.	Turning Basin	2400 ft.

6. Existing Wharfage and Docks:

There are two major wharves in Goose Bay approximately 2 km from proposed site which serves a variety of vessels passing in and out of Terrington Basin - Lake Melville.

(1) Main Wharf - length 243 m along outer face with a 40 m jetty. Depth alongside 5.8 m (19 ft.) There are five main storage sheds on the main wharf totalling 4400 m^2 storage space.

(a) Transport Canada Dock - length of 280 ft. with a depth alongside of 20 ft. A freight shed is situated on its outer end.

The actual degree of usage of these facilities could be in conflict with existing users.

7. Ice Restricted Access:

Commercial shipping usually occurs between mid June to mid October with possible shipping until late November depending on ice conditions. Passage through Lake Melville from November to June is being studied to determine whether it is possible to extend the shipping season.

8. Wave Restricted Access:

Goose Bay port protected from waves in all directions. Probable maximum wave height 3½ ft.

9. Wind Direction and Speed: Unknown

10. Fog: - is considered to be generally fog free.

11. Current: 3-6 knots in western passage around Henritta Island and 2-5 knots in the narrows.

12. Tidal Variation: - 2.8 ft.

13. Seabed Conditions: - Sandy.

14. Land Availability Foreshore:

Sufficient foreshore land available. Level and low-lying.

15. Industrial Land Availability:

Developed industrial land is in good supply in Happy Valley - Goose Bay, especially the south side area. The north side area, which is partially serviced, has approximately 28 hectares available. The quantity of land required for air-related support has not been determined.

16. Topography:

The area is composed of a thick marine and alluvial material. Sand layer overlying silt and clay. There is very little gravel in the area. Vegetation cover consists of grass, shrubs and coniferous trees.

Physical and Social Infrastructure

17. Water Supply:

The site is serviced by the Goose Bay water system which mainly draws water from Spring Gulch. The capacity of the spring is unknown but the pumping capacity of both the spring and the intake from the Churchill River is approximately 22,260 m^3 per day. Theoretically the surplus capacity is almost 11,000 m^3 per day. Substantial improvements however would be required before this surplus capacity could be realized on a reliable basis.

18. Power Supply:

The Upper Churchill power supply would suffice the needs of all potential offshore petroleum industries.

19. Sewage Disposal:

A sewer system is in operation on the site. Sewage is untreated and discharged into Terrington Basin. The Basin has a low flushing capacity and it has been proposed to unchannel sewage outflow from the Basin to Churchill River to avoid serious environmental problems. Estimated cost $2,370,000 (1979). Federal and Provincial funding has been committed to this project.

2. Solid Waste Disposal:

There are two disposal sites - Goose Bay and east of Happy Valley. The capacity of these sites is unknown and the site in Goose Bay seems to be polluting streams that drain into Churchill River. Facilities need to be assessed prior to any large scale industrial development.

21. Housing:

There are few housing facilities in the immediate area of the site. However in the areas of Happy Valley, Spruce Park, Hamilton Heights and the southside there are a substantial number of vacant houses (previously occupied by Americans to 1976) which are owned by the Federal and Provincial governments. As well there are a significant number of dormitories suitable for single or temporary accommodations left by the U.S.A.F. on the southside which could accommodate up to 500 persons. Similarly, there are 90 serviced lots available for infilling and a lot more unserviced land within the boundaries of Happy Valley - Goose Bay available for residential development.

22. Schools:

There are six schools in Happy Valley - Goose Bay with an enrollment in 1980 of 2,177. Surplus capacity is estimated at 500.

23. Vocational School:

There is a district vocational school in the town.

24. Access to Medical Facilities:

There are three hospital facilities in the area - Happy Valley, Goose Bay and a Grenfell Mission Hospital in North West River.

25. Highway Access:

All roads on the site are paved and designed for year round driving. There is a paved highway between Happy Valley and North West River.

26. Rail Access: None

27. Airport Access: The site is adjacent to Goose Bay Airport.

Environmental Preview

28. Seabirds

There is a seabird area on Gannet Island off the Labrador Coast in the area of Hamilton inlet.

Caribou & Moose

There are no caribou or moose wintering or calving grounds within a 36 mi. radius of the site.

Forestry

Productive forests do not occur within 15 miles of the site. There are 13 sawmilling operations with a production of 275,000 f.b.m. and an employment level of 10 manyears. The Goose Bay Timber Company recently formed has been utilizing logs previously cut for the Stephenville Liner Mill.

Fishery

There are 110 registered inshore fishery vessels. A total of 114 fishermen with a manyear effort of 9.1 years. Landing in 1977 were 245,000 lbs. at a value of $75,029.

Agriculture

No conflict between site and resource land.

Recreation

No conflict.

29. Acoustic Impact:

Site already industrial. No impact anticipated.

30. Visual Impact: Already industrial area.

Social and Economic Considerations

31. Demographic Change:

Goose Bay could easily absorb a fairly high population in-migration without significant strain on its present infrastructure.

32. Labour Force Characteristics:

The labour force population of the area was 2230 people in 1976. In 1980 it was estimated that this labour force had increased to 2250 to 2300. In January, 1981, there were 730 unemployed with almost 50% (361) listed as construction, fabricating and transport equipment. The skills of the local labour force are to a great extent unrelated to the requirements of operating a supply base, such as supply/air or for support services such as testing, welding, underwater services, rig inspection, and maintenance and repair. Service oriented skills however may be applicable to air related activities.

Pre-Conditions for Site Suitability

1. Improvements to water supply system.
2. Un-channel sewage outflow from Terrington Basin to Churchill River.
3. Identification of potential training skill requirements and implementation of program.

Facilities Required:

With regard to air related activities the water supply will require some upgrading to obtain available surplus capacity. Existing housing facilities, especially dormitories, will require upgrading if a large influx of people occurs.

While large scale marine activity seems unlikely, existing facilities may be able to cope with a moderate increase. Site preparation in the foreshore area and upgrading of utilities at the docks may be required.

Costs to provide these internal services are unknown.

PRELIMINARY EVALUATION
HARBOUR GRACE
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: HARBOUR GRACE

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	600		
- waveheight (3 ft.)		very occasional 3' waves	
- cargo wharf 33' draft (500 ft.)		to be built	
- supply wharf 20' (900 ft.)		to be built	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	25	needs dredging, attainable	
- channel width (800 ft.)	250		
- approach depth (33 ft.)		25'bar is shallow entrance	
- turning basin (1000 ft.)	2350		
FORESHORE AREA (20 A)	25	to be infilled	
INDUSTRIAL AREA (200 A)	200	government owned breaker	
ICE FREE (5% interference)		may occasionaly used ice	
PROXIMITY TO DEVELOPMENT	250		9
7. TRANSPORT NETWORK			
- highway		by-pass needed	5
- rail		would need upgrading	5
- air		nearest St. John's	5
SOCIAL AND ENVIRONMENTAL (ranked)			
EXISTING INFRASTRUCTURE			
- schools	200 vac.		5
- vocational schools		Carbonear, Seal Cove	3
- medical facilities		Carbonear Hospital	10
- housing		52 serviced lots-Carbonear	4
- power supply			10
- sewage disposal		treatment may be required	10
- solid waste disposal		local incinerator being built	5
WATER SUPPLY		extension required	5
QUALIFIED LABOUR			
- **construction (200)**		8040 m, 3865 f.	10
- **fabrication**		2363 const., 329 fab.	10
LAND USE COMPATIBILITY			
- fishing		on site fish plant- mostly inshore	5
- forestry		little potential dev.	8
- agriculture		no conflicts	10
- salmon rivers		no conflicts	10
- wildlife		no conflicts	10
CAPITAL COST			

HARBOUR GRACE

Harbour Grace is located on the north side of Conception Bay, about 130 km from St. John's. The population, in 1976, was 6,160 . Harbour Grace is located about 5 km from the town of Carbonear, with a population of 8,140 (1976) and lies within a region having a total population in excess of 37,000 people. It is easily accessible to the north side of Trinity Bay, with its population of approximately 10,000 people.

The existing economic base of the town consists of a seasonal fish plant (Ocean Harvesters) with a 1980 employment level of 250 people, a safety boot manufacturing operation (Terra Nova Shoes) currently employing 125 people, some service industry and the inshore fishery. The latter industry employed 889 fishermen in 1980, or 198 manyears.

The harbour at Harbour Grace is about 2½ miles long, with an average width of just under ½ mile. It is exposed to the northeast, with partial protection being provided by a submerged sand-bar which extends across the outer part of the harbour. A buoyed channel, with a least depth of 25 feet provides a passage for shipping in and out of Harbour Grace.

The site for the proposed supply base is at Kings Beach, on the southside of Harbour Grace. This site has been the subject of detailed study by various engineering and oceanographic consultants as part of the "Central Fishing Port" study that was undertaken in 1977 and 1978.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area (inside bar) 600 acres
2. Water Depths:
    - (a) Approach Channel - 25 ft. @ LWOST
    - (b) Wharf Site - 30 ft. @ LWOST
    - Max. within harbour - 57 ft. @ LWOST

Dredging will be required to widen and deepen the channel through the entrance bar.

3. Chanel Widths @ 25 ft. draft 250 ft.
4. Existing Wharfage:

There is a public wharf on the north side of Harbour Grace, which is used entirely for fishery-associated purposes. The nearest public wharf that could be used for any oil-related activity is located at Carbonear.

5. Ice Restricted Access;

Ice may occur in Conception Bay between mid January and March and clear between mid March to April 20. Duration of ice presence is normally short. Based on statistics for the period 1960-1980 the mean annual duration of ice of 1/10 or greater concentration in the approaches to Conception Bay is 18 days. Most of the supply vessels now operating are ice strengthened and would be able to navigate 90% of the days with ice concentration of 1/10 or greather though time required for trip would be lengthened considerably. In

Conception Bay, dense draft ice can occur if there is a general trend for the pack ice to remain close to shore. (NNE prevailing winds). These conditions may require an ice breaker to allow for ship passage.

6. Wave Climate:

It is estimated that oceanic waves from directions which permit penetration to the site ocean occur for only about 100 hours per year. These waves will be strongly attenuated by breaking and refraction so that they will seldom exceed 2 ft. in height. Local waves generated in the harbour may occasionally cause waves in excess of 3 ft. in height. With a proper (non-reflecting) dock design, a breakwater at the Kings Beach site should be unnecessary.

7. Wind Direction and Speed:

Along the east coast of Newfoundland westerly winds prevail with shifts in direction due to storms or low pressure ridges. Gale force winds (57.5 to 101 km/hr) occur 5 to 6% of the time with a high of 10 - 16% in winter and a low of 1% in spring and summer.

8. Fog:

Fog occurs during May, June, and July. Sea fog type as opposed to an inshore fog. Offshore winds aid in maintaining better visibility inshore, particularly along the east coast of Newfoundland.

9. Tidal Variation:

Tides have an amplitude of 1.4 (4.6 ft.). Tides of such low amplitude would not hinder the docking and loading of tugs and offshore service vessels.

10. Currents:

Kings Beach seems to have been formed as a result of east-west wave induced littoral drifting of beach material to a point where the wave energy was insufficient to carry the material any further. Therefore, unless the configuration of the shoreline is substantially altered, currents and littoral drift should not be a problem.

11. Seabed Conditions:

Generally mud, sand and gravel, with some large cobbles. The bar at the entrance of the harbour contains large boulders overlying sand and gravel.

12. Proximity to Grand Banks exploration/production activity: 220 miles.

13. Foreshore:

Requires some filling between the south side road and proposed dock site. This fill material will be excavated from the gently rising land just south of the road to provide a level area of approximately 25 acres.

14. Industrial Land Availability:

There is adequate industrial land to the north and west of the site. Approximately 200 acres have been acquired by Government for the proposed central port.

The development area is immediately west of the proposed fishery Primary Landing and Distribution Centre (PLDC) and associated industrial site and partially overlaps this area. The proposed development site consists of 240 ha and consists of two fairly level areas separated by a 20% slope. The area is vacant except along Southside Road (northern boundary at shoreline - residential) and the Conception Bay Highway (western boundary - residential, nursery, post office).

15. Topography:

This area contains very little till (2-4 m) and it is somewhat eroded along the hillside. Some places have only rock concealed by vegetation. The immediate coastal area between Kings Beach and Riverhead may contain some outwash deposits. Subsoils for the most part are expected to be stable.

Physical and Social Infrastructure

16. Water Supply/Sewage Disposal:

There is no piped water supply or sewage collection in Harbour Grace South. Proposals for development of the adjacent PLDC included construction of a water line from the Harbour Grace supply, Bannerman Lake, to the PLD centre and its associated industrial area. The estimated cost was $2,500,000. Sewage disposal should not present problems as site is located on waterfront but sewage treatment may be required depending on volume and type of waste water.

17. Power Supply:

The power supply in the area is controlled by Newfoundland Light and Power. Power supply to site should not present problems.

18. Solid Waste Disposal:

A permanent base would most likely require a separate landfill site. Approximately 9 ha would be required. At present municipalities in the region share solid waste disposal facilities. Beginning shortly, communities from Salmon Cove to Brigus will use a new pit incinerator located in and operated by Harbour Grace. It will have a capacity of 80 tons/day of domestic and commercial waste.

19. Housing:

The immediate subregional area offers the potential for housing development to accommodate modest additions to the area's permanent population. Within all the municipalities and settlements of the region there is considerable infill land available for residential development. In adjacent Carbonear there are 52 serviced lots available.

20. Schools:

School enrollments indicate in a general way the size of existing facilities. There are presently six schools in Harbour Grace with 61 teachers and an enrollment of 1450.

Three of the schools are presently underutilized and have the capacity for an additional 200 students. As well there is a planned expansion to one of the elementary schools with a capacity of another 50-60 students.

21. Vocational Schools:

There is no vocational school in Harbour Grace but one in Carbonear, 3 miles north.

22. Access to Medical Facilities:

There is a 100 bed full service hospital at Carbonear with 14 physicians on staff. Harbour Grace has 4 physicians, 1 public health nurse and ambulance service.

23. Highway Access:

The major line to T.C.H. is Route 66, Roaches Line. Road access from the site will be from the congested Conception Bay Highway (Route 70) which forms part of the development area western boundary. The proposed Conception Bay North By-Pass, a $19.2 million project would have to be implemented to improve road access both for Harbour Grace and Bay Roberts sites to enable the transport of heavy materials.

24. Rail Access:

A CN rail branch line runs up the shore from Holyrood to Carbonear. The line is little used and is unlikely to provide an alternative transportation route for heavy materials.

25. Airport Access:

The nearest airport is Torbay, St. John's, 100 km away.

Environmental Preview

26. Natural Environment:

The area proposed for development is presently vacant. There are no on-site salmon rivers and wildlife re moose and caribou have no established calving or wintering grounds within a 36 mile radius of site. Terrestrial wildlife would not be directly effected by development on the shore or near shore areas.

Seabirds and Waterfowl

A variety of seabirds and watefowl in Conception Bay area. Area is not a seabird sanctuary. Major impact only in case of oil spill.

Fisheries

In 1980 the Harbour Grace area showed a sizeable inshore fishery. There were 539 boats, 889 fishermen (198 manyears) and total landings of and a landed value of 12 million dollars. In the Harbour Grace area (Dildo to Carbonear) there are 11 fish processing operations employing 1567 persons or 1147 manyears.

Agriculture

The Harbour Grace site is not in conflict with any agriculture development area.

Recreation

No conflict between recreation use and proposed site.

Forestry

In 1980 there were 55 small sawmilling operations in the catchment area (30 mile radius) with an estimated 1.5 million fbm and an estimated employment of 48 manyears.

Impacts on the fishery and other resources due to port construction in Harbour Grace are likely to be minimal.

27. Acoustic Change: - minimal impact.

28. Visual Aesthetics: - minimal impact.

Social and Economic Considerations

29. Community Services:

As the proposed site lies within easy commuting distance of a variety of communities access to a wide range of facilities is available. The strain on existing facilities will depend on the degree of in-migration associated with the proposed development.

30. Demographic Change:

It is anticipated that only a moderate change in population will occur and this will be spread amongst a number of communities rather than being localized.

31. Labour Force Characteristics:

The 1976 Labour Force activity for the Conception Bay

North Shore subregion indicated a large male labour force at the time of 8,040 and a female labour foce of 3,865. Unemployment rates for males and females respectively were 21% and 25.1%. There is no breakdown by occupation.

In 1978, the number of taxpayers in the Conception Bay North Shore region were 14,372 with an average income of $10,209.

In order to get some indication of the skills of the unemployed in the region, unemployment insurance figures for January, 1981, were used. The skills of most interest for service base operations are general labourers and marine related occupations. Without regional information on the pool of these skills, both employed and unemployed, it is impossible to estimate the labour force resident in the region who would be available for employment at the site and therefore what the potential in-migration might be. However, for purposes of this preliminary assessment the unemployed at present were used. Of the 6,850 unemployed, 34.5% (2363) were listed as construction workers; 4.7% (329) as machinery and fabrication 4.5% (298) as transport equipment and material handling, 27.1% (1,834) as processing and the remainder split amongst the remaining occupations. From this information it would appear that there is a sizeable labour supply to meet the labour demands associated with the proposed development.

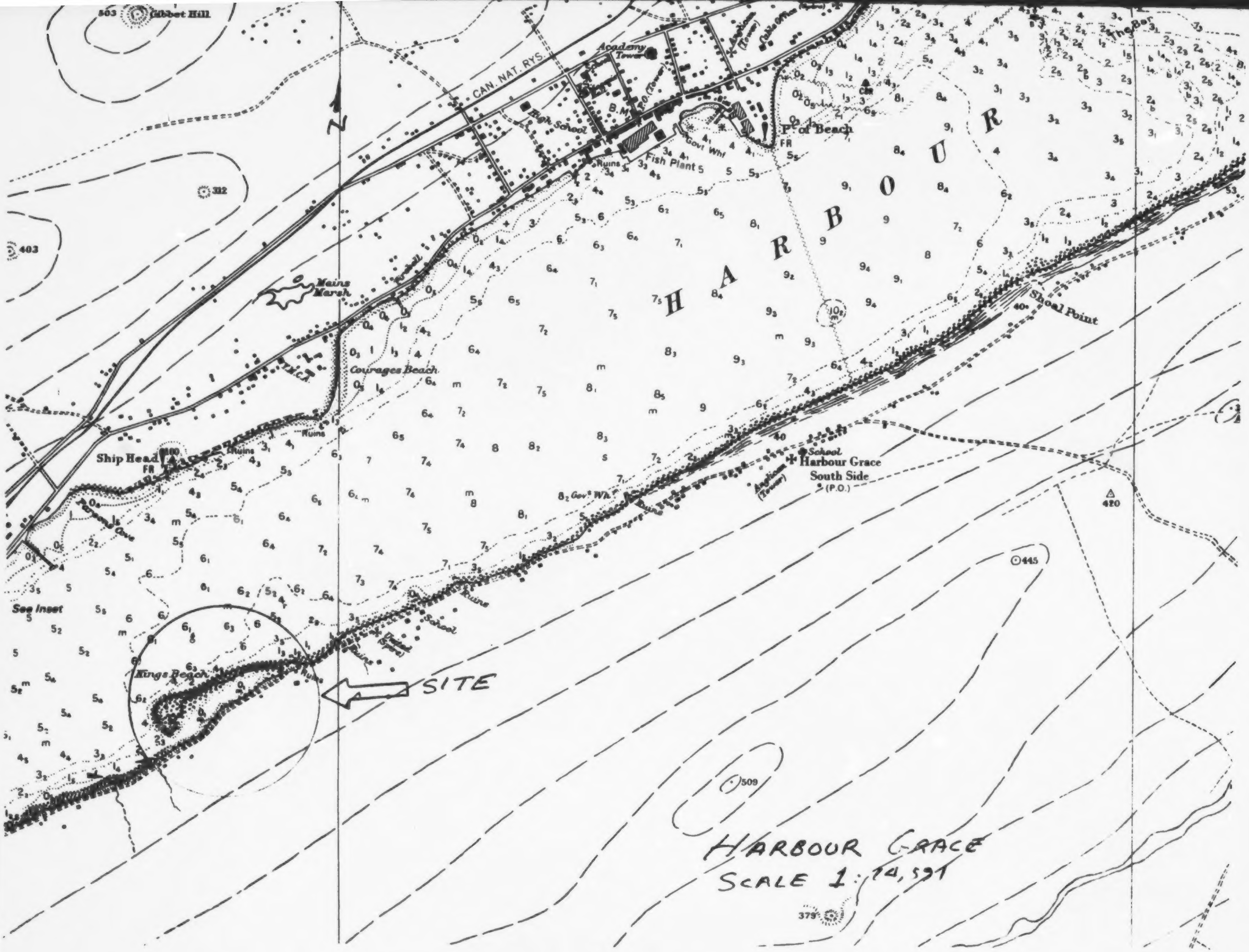
Pre-Conditions for Site Suitability

32. Constraints:

- access to water and role of Southside Road in development and the impact on Southside Road residents to be determined.
- municipal upgrading package required to go hand in hand with developers industrial package.
- Conception Bay North By-Pass to be implemented. Estimated cost 19.6 million dollars.
- Facilities Required:

1.	Wharf (1400' docking face)	$ 8,000,000
2.	Dredging	1,200,000
3.	Site Development (20 acres)	1,500,000
4.	Industrial Water System	3,000,000
5.	Conception Bay North By-Pass	19,200,000
	Total	$32,900,000

The cost of development and internal servicing for an industrial park must be added to the above, as must the cost of local road upgrading.


Gibbet Hill
503
312
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CAN. NAT. RYS.
Academy Tower
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Fish Plant
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Mains Marsh
Courages Beach
Ship Head
Ruins
Shoal Point
School
Harbour Grace South Side
(P.O.)
Anglican Tower
Gov't Whf
420
445
509
379
See Inset
Kings Beach
School
Ruins
N

SITE

HARBOUR GRACE
SCALE 1: 14,591

PRELIMINARY EVALUATION
HERMITAGE
AS A LOCATION FOR
CONCRETE PLATFORM CONSTRUCTION

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: HERMITAGE

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			
- cargo wharf 500' at 33'		3000' entrance	
- Dock 650'X650' at 33'		attainable	
channel width 800'	3700'	at 36' deept	
- Buildup Site 800' at 260'	1800'x 300'	available	
- Tow-out Base min depth 425', min width 200'	600'/2200'	available	
- Wave height, 3'			
- Deep Sink Site 800'wide @ 660'	1100'x 660'	available	
2. FORESHORE AREA (50 A)	50	major landfill and excavation	
3. INDUSTRIAL AREA (200A)		only the above	
4. ICE FREE		all year	
5. TRANSPORT NETWORK			
- highway		part gravel	5
- rail		B.Falls nearest jct.	0
- air	Gander	270 miles	0
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools (400 vac.)		little space	1
- vocational schools		G.Falls nearestsch.	0
- medical facilities		Hr.Breton cot. hosp.	5
- housing		no housing land banked	0
- power supply		costly dev.	0
- sewage disposal		needs to be dev.	0
- solid waste disposal		needs to be dev.	0
2. WATER SUPPLY		must be dev.	0
3. QUALIFIED LABOUR			
- construction	1990	very few skills	3
- fabrication		only 1.6% fab. experience	3
4. LAND USE COMPATIBILITY			
- fishing		1 offshore plant in Gaultois	6
- forestry		no act.in this area	10
- agriculture		little possibility	10
- salmon rivers		little impact	10
- wildlife		little impact	9
C. CAPITAL COSTS			

HERMITAGE BAY

General Description

Hermitage Bay is located in the central part of the south coast. It is a long, narrow, fiord-type arm which runs inland in an ENE direction for approximately 24 km. At its entrance the Bay is 1600 metres wide and gradually narrows over 18 km until Round Cove Head where it is 800 metres wide. From this point the Bay tends slightly to the east for the final 6 km.

The site chosen in this area is located on the southern shore of the Bay and immediately to the east of Round Cove Head in an area known as Barasway Harbour. Access to the site is possible up to 1 km by a gravel road off Route 360 from the Trans Canada Highway, at Bishops Falls.

The nearest towns to the site are Hermitage, 24 km to the southwest and Harbour Breton, approximately the same distance to the south. In 1976 Hermitage had a population of 823 while Harbour Breton had a population of 2269. The adjacent Bay D' Espoir area which contains the communities of Milltown and St. Albans together with Hermitage and Harbour Breton gave the area a population of 8,525 in 1976.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area -
2. Protected Area (Entire Bay) -

3.	Channel Depths	600 ft.
	Harbour Depths	600 ft.
4.	Channel Widths	3000 ft.
5.	Turning Basin	-

6. Existing Wharfage and Docks:

No docking facility of any description is available at the site. Hermitage, the closest town to the site by water has a government wharf capable of accommodating coastal vessels of 500 to 1000 tons and is a port of call on the scheduled services of C.N. Marine on the south coast.

7. Ice Restricted Access:

Hermitage Bay is unaffected by coastal pack ice and access by sea is possible all year. Only in the most severe winters will landfast local ice appear with a maximum thickness of 30 cm affecting the inner half of the Bay. Landfast ice may have a duration of 2 months.

8. Wave Restricted Access:

The maximum wave heights can be in the order of 3.0 metres with a 20 year storm surge of 0.9 metres.

9. Wind Direction and Speed:

The average wind speed at the site during January has been shown to be 25 km/hr. while during July it has been 15 km/hr. Wind direction is predominantly from the southwest with probable maximum wind speed coming from the southwest at 160 km/hr.

10. Fog:

Fog is a common occurrence along the south coast throughout the twelve months of the year. Annual incidence of fog has been recorded up to 90 days of the year at the Hermitage Bay site.

11. Currents:

The maximum tidal range at the port of Hermitage, close to the mouth of the Bay is documented as 2.2 metres. The tidal range at the site is expected to be of a similar magnitude. No surface currents of any severity are known to exist in the Bay and it is not anticipated that any currents will be encountered which would create excessive difficulty for towing offshore production facilities.

12. Tidal Variation:

Tidal amplitude is 7.2 ft.

13. Seabed Conditions:

It is necessary to conduct shallow seismic surveys of seabed conditions at the site and collect sediment samples from the bottom. At present this type of geotechnic information is not available for the Hermitage Bay site although the seabed is possibly of rock structure.

14. Proximity to Drilling/Production Activity:

15. Land Availability Foreshore:

Most of the land around the site area varies from barren rock through sedges and grasses on muskeg and organic deposits to extensive till and scrub growth on glacial till.

16. Industrial Land Availability:

The proposal for the site indicates a plan with a total area of about 20 hectares. This would be created in part by massive rock excavation involving some 480,000 cubic metres, and in part by reclaiming land from the Bay with the excavated rock.

17. Topography (surficial geology):

Abundant faulting in the area of the site has led to the development of irregular, rugged terrain. Glacial action has exposed hilltops and created shallow to moderately thick deposits of coarse-grained till in most low lying areas. Fine grained soils are generally non-existent in any quantity.

Physical and Social Infrastructure

18. Water Supply:

At present there is no municipal water system supplying the site. It will be necessary to construct such a system before the site can be used to house a proposed labour force of 600 workers.

19. Power Supply:

Electric power is supplied to the Hermitage Bay area by Newfoundland Hydro and distributed by Newfoundland Light and Power Company Limited. Power distribution is adequate and a load of 3-4 megawatts, as would be required for the proposed development, can be provided.

20. Sewage Disposal:

No sewage treatment system exists at the site, making it necessary to provide adequate facilities before construction could proceed.

21. Solid Waste Disposal:

There is no solid waste disposal facility available at the proposed site.

22. Housing:

The proposed development requires the erection of a construction camp at the site for approximately 600 workers. Most of the houses in the major towns in the region are owner occupied with rental units being quite limited. Any major influx of construction workers into these towns could not be handled by the existing facilities.

23. Schools:

Two school boards serve the region with schools in each of the major towns of Hermitage, Harbour Breton, Milltown and St. Albans. The combined number of schools for these towns in 1977 was 9 with a total of 97 teachers and an enrollment of approximately 2300 pupils. Any sudden significant temporary rise in school population in the area would probably best be handled with the use of portable classrooms.

24. Vocational Schools:

There are no vocational schools in the area. The closest school to the area's communities is located at Grand Falls, 260 km away by road.

25. Access to Medical Facilities:

There is a provincial government cottage hospital at Harbour Breton which serves the area. This hospital has 25 beds and is staffed by 3 doctors and 8 nurses plus other technicians and assistants. There are also family doctors and clinics in each of the communities of Hermitage, Milltown and St. Albans. Two dentists serve the region.

26. Highway Access:

The proposed site is isolated, although the general area is accessible by a gravel road (Route 360) which passes within 1 km at an elevation of approximately 50 metres. Route 360 is accessible from the Trans Canada Highway at Bishops Falls approximately 200 km from the site, by a first class paved highway.

27. Rail Access:

The nearest rail junction is at Bishops Falls, approximately 200 km by road.

28. Airport Access:

The nearest airport is at Gander, approximately 270 miles away.

Environmental Preview

29. Natural Environment:

The Hermitage Bay area is not a prime area for wildlife. It is designated as having low potential for moose and caribou. While the region generally has good capability for furbearer species, only otter and mink are frequent visitors to the coastal area. Otter and mink are highly mobile and would easily accommodate the presence of an onshore development.

Seabirds and Waterfowl

There are no abundant upland game birds and neither is there a productive waterfowl habitat in the area. Good nesting populations of bald eagles (an endangered species) are found in the region, although the presence of the proposed development should not affect their numbers. The main area for concern is the possible adverse influence which increased access and hunting pressure might have on local seabird populations.

Fisheries

Hermitage Bay is primarily important as a fishing area to the inshore fishermen of Hermitage and to a lesser extent to fishermen at Gaultois. A minimum of 130 fishermen in approximately 70 boats pursued the fishery out of Hermitage and Gaultois in 1975. Hermitage, with approximately 75 fishermen and 40 boats is entirely an inshore fishery. Gaultois has a major processing plant and is primarily serviced by an offshore trawler fleet. Hermitage processes all of the catch from its inshore fishermen in a smaller facility.

Agriculture

There is no agricultural activity located at the proposed development site. Soils throughout the area are designated as having little capability for producing arable crops.

Forestry

No substantial forest resources are found in the area of Hermitage Bay. Lands in the area have severe limitations which preclude the growth of commercial forests. At present the forest is only of importance to local residents for firewood.

Recreation

This area has been designated as having good capability to support moderately dispersed recreational use. Should the development proceed the area will become less valuable for the type of recreation it now offers.

30. Acoustic Change:

At present the area provides a quiet wilderness experience. The noise factor associated with the proposed development would disrupt the peaceful environment.

31. Visual Aesthetics:

The Hermitage Bay area with its fiord type coastline is an aesthetically pleasing area of the Province.

Social and Economic Considerations

32. Community Services:

There are limited social amenities and an inadequate infrastructure system in place at the present time in the Hermitage Bay region to support the proposed development. There is no large growth centre in the area and the population is concentrated in the Hermitage, Harbour Breton and Bay D'Espoir areas.

33. Demographic Change:

In 1976 the combined population of the major communities in the region was 6,421 as compared with 6,010 in 1971. In the community of Milltown during 1966-1971 there was a doubling of the population due to a major hydro electric construction project. No significant flucations in the regional population are expected over the next ten years unless the proposed development goes ahead.

34. Labour Force Characteristics:

The region was settled about 150 years ago and since then its main economic activity has centered around fishing with forestry the secondary employer. In 1976 it is estimated that approximately 50% of the labour force was primarily employed in the fishery. Manufacturing in the region, based on fish processing and small scale sawmilling is the second major employer, employing 295 people in 1976. During the same year the regional labour force total was approximately 1,990.

At present unemployment in the Hermitage Bay area is estimated to be in excess of 50%. This is highest in the Milltown/St. Albans area where the labour force is mainly construction labourers.

Pre-Conditions for Site Suitability

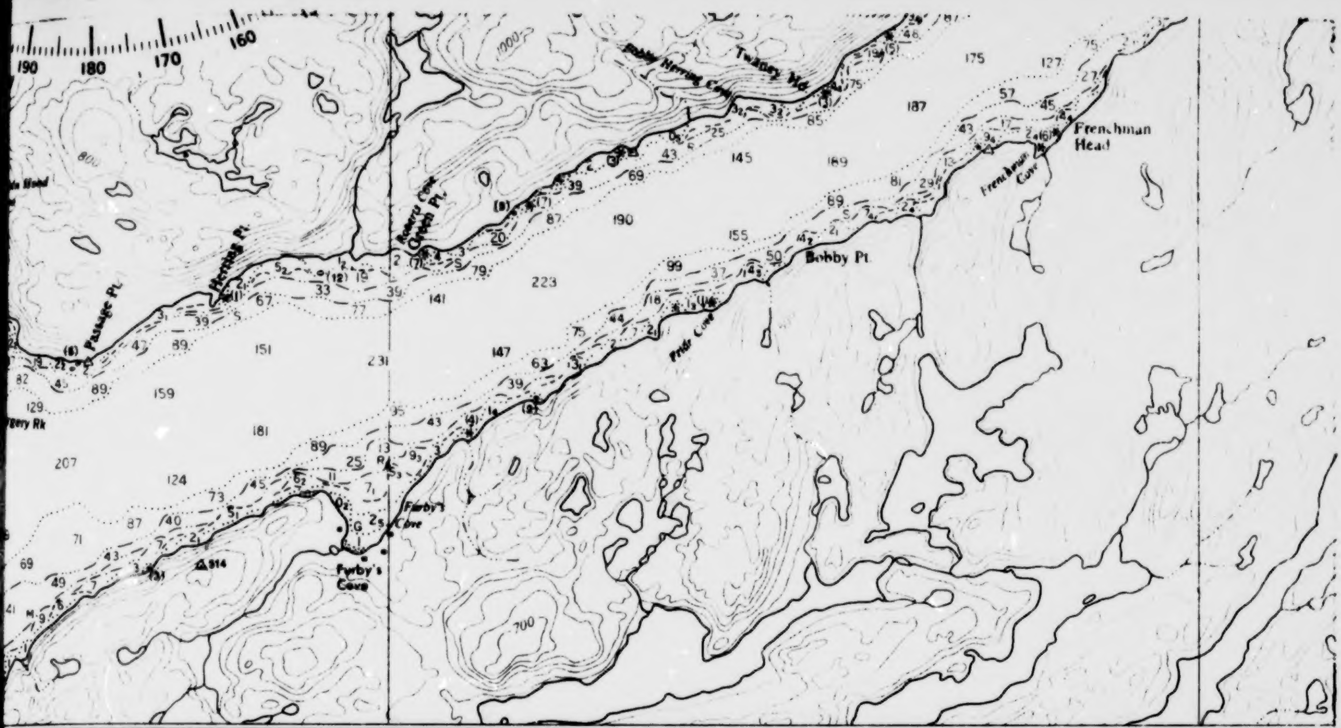
35. Constraints:

- although the Hermitage Bay area is accessible by a gravel road, the site itself is isolated requiring the construction of 1 km of road.
- several small communities are located within a 50 km radius of the site but cannot be considered within commuting distance unless existing roads are upgraded.
- climatic conditions prevailing at Hermitage Bay will have influence on the schedule of site development.
- due to the complete lack of any infrastructure at the site there will be a need to put in place all infrastructure associated with the development including the erection of a construction camp for about 600 workers.
- should local communities be chosen to service the development appropriate steps would have to be taken to mitigate against possible social and economic disruptions.

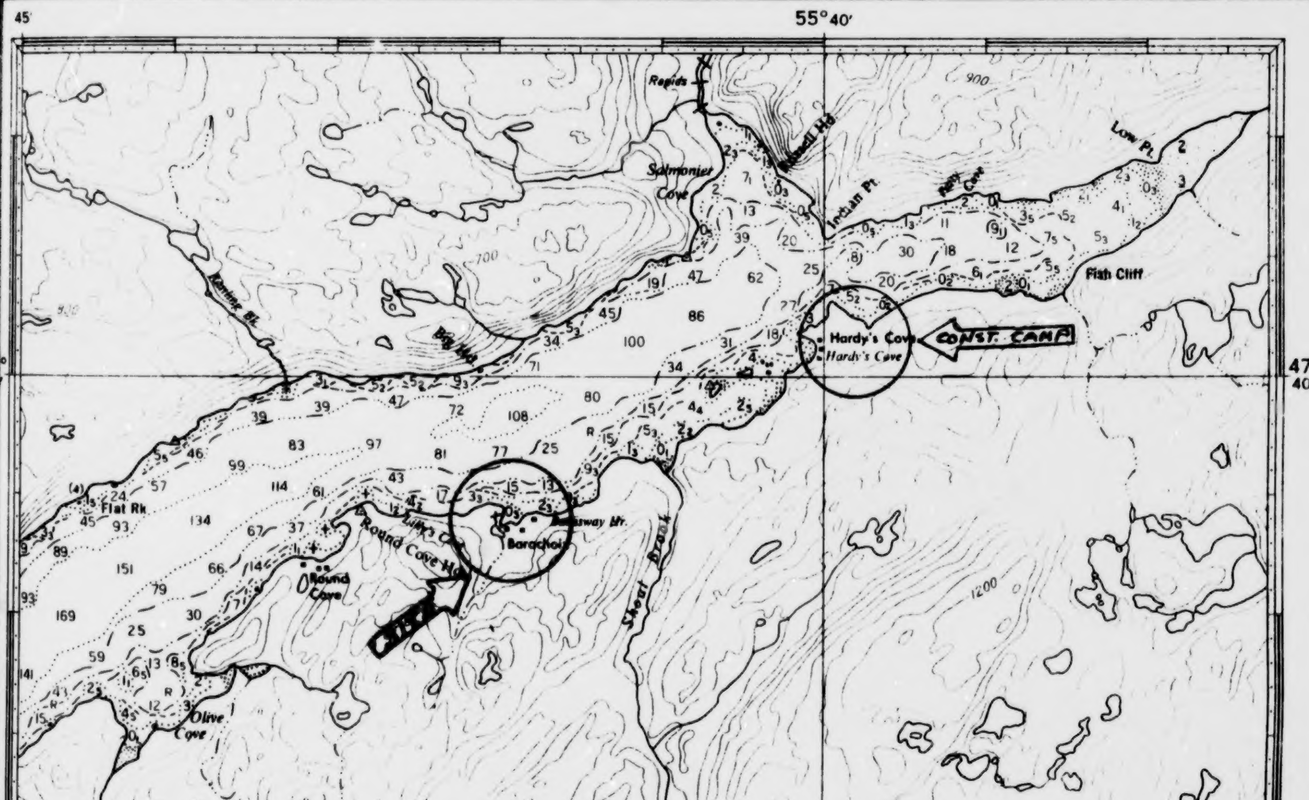
36. Facilities Required:

- Wharf	$ 3,500,000
- Water Supply	3,000,000
- Graving Dock	21,000,000
- Road	250,000
- Contingencies	1,250,000
Total	$29,000,000

The cost of miscellaneous industrial facilities, internal servicing and local roads, etc., will be extra.



Twaney Hd.
Bobby Herring Cove
Frenchman Head
Frenchman Cove
Round Cove
Green Pt.
Herring Pt.
Passage Pt.
Bobby Pt.
Pride Cove
Furby's Cove
Furby's Cove



55°40'
45'
47° 40'
Rapids
Salmonier Cove
Indian Pt.
Low Pt.
Fish Cliff
Hardy's Cove
Hardy's Cove
CONST. CAMP
Big Hd.
Flat Rk
Round Cove Hd
Round Cove
Barachois
Shoal Brook
Olive Cove
HERMITAGE BAY
CONTINUATION AT SAME SCALE
Use adjacent compass
SCALE 1:50,000

PRELIMINARY EVALUATION
HOPEDALE, LABRADOR
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

ocation: HOPEDALE

. Physical and Economic(critical)	Actual	Remarks	Ranking
. SHELTERED HARBOUR			
- protected area (150 A)	20A	+ large protected area	
- waveheight (3 ft.)	< 3	available	
- cargo wharf 33' draft (500 ft.)			
- supply wharf 20' (900 ft.)		approx. 15' deep - 240'	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	25'	too shallow for large cargo vessel	
- channel width (800 ft.)	300'@ 25'	" " "	
- approach depth (33 ft.)			
- turning basin (1000 ft.)	700	inadequate	
3. FORESHORE AREA (20 A)	< 5A	inadequate	Critical
4. INDUSTRIAL AREA (200 A)	none	very difficult to develop	
5. ICE FREE (5% interference)			
6. PROXIMITY TO DEVELOPMENT			
7. TRANSPORT NETWORK			
- highway		none	0
- rail		none	0
- air		150 mi south Goose Bay	0
8. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE			
- schools		no excess	0
- vocational schools		none	0
- medical facilities		nursing station	0
- housing		repair base bldgs.a possibility	0
- power supply		new generation for 1981	10
- sewage disposal		must be developed	0
- solid waste disposal		must be developed	0
. WATER SUPPLY		must be developed	0
. QUALIFIED LABOUR			
- **construction** (200)	31	very small labour force	2
- **fabrication** (100)	0	" " "	0
. LAND USE COMPATIBILITY			
- fishing		no conflicts	10
- forestry		"	10
- agriculture		"	10
- salmon rivers		"	10
- wildlife		"	10
. CAPITAL COST			

HOPEDALE

General Description

Hopedale is located on the north side of Hopedale Harbour, some 150 miles north of Hamilton Inlet. Hopedale is connected to other coastal communities by coastal boat in summer and year round by Labrador Airways. The communities of Davis Inlet (285) and Nain (930 population) are located north about 50 and 190 air km respectively. Makkovik (325 pop.) and Postville (185 pop.) lie about 90 km to the south while Happy Valley - Goose Bay is about 240 km away.

The community of Hopedale itself is on rocky coastal terrain with steep mountains inland behind the settlement. In 1976 the population was 447, and the labour force was 104.

The site in Hopedale which has been nominated for a supply/service base consists of the former USAF base and dock facilities. The base area consists of about 20 hectares with only one hectare developed. Much of the vacant area is unsuited for development due to the rugged steep terrain. The dock and base are 1 & 2 km respectively from the existing Hopedale community via a low quality road. Hopedale has been used as a staging area by Petrocan for refueling and communications - employing 2 full-time and 2 part-time personnel. Lab Sea Co. Ltd. employed 10 local, and 14 outside workers for supplying fuel, fresh water and provisions for fishing vessels and Petrocan supply boats.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (at 33 ft.)	20 acres
2.	Semi-Protected Area	Large
3.	Channel Depth	25 ft.
	Harbour Depth	38 ft.
4.	Channel Width (at 33 ft.)	0
	(at 25 ft.)	300 ft.
	Approach Entrance	600 ft.
5.	Turning Basin (at 33 ft.)	700 ft.

6. Existing Wharfage and Docks:

Main Wharf - length 105 feet and depth alongside of 17 ft. A shed is located at inner end of the wharf (400 sq. metres).

Coastal Boat Wharf - 49 metres of berthing space with depth alongside 15 feet.

Labrador Airways - floating dock for seaplane use.

7. Ice Restricted Access:

Harbour is frozen over between December and May.

8. Wave Restricted Access:

Maximum wave height of 3 ft. All weather harbour.

9. Tidal Variation: - 7.7 ft.

10. Seabed Conditions:

Loose silt and sand overlying a dense material, probably rock.

11. Land Availability Foreshore:

Insufficient level land, less than 5 acres suitable.

12. Industrial Land Availiability:

Insufficient land. Rugged steep terrain, undevelopable or at extreme expense.

13. Topography:

The on site terrain, typical of the area,is quite rocky with steep slope and occasional patches of bog.

Physical and Social Infrastructure

14. Water Supply:

The community of Hopedale gets its water supply from a combination of drilled wells and a small surface resevoir used only in summer. Supply is inadequate and a new water supply source would have to be developed to service a supply base operation.

15. Power Supply:

Serviced by its own generating station. A new plant to be installed in 1981.

16. Sewage Disposal:

No facilities, would have to install system.

17. Solid Waste Disposal:

No facilities, a site would have to be developed.

18. Housing:

No vacant housing available and limited residential land for development. The only way to accommodate a number of outside workers would be to rehabilitate some of the abandoned base buildings.

19. Schools:

There is one school in the settlement.

20. Vocational School:

Nearest in Happy Valley - Goose Bay.

21. Access to Medical Facilities:

A nursing station is located in settlement. Nearest hospital, Happy Valley - Goose Bay.

22. Road Access:

None to Hopedale. Access road from settlement to site in poor condition.

23. Rail Access: None

24. Airport Access: Goose Bay, 240 km south.

Environmental Preview

25. Resources:

Seabirds and Waterfowl

A variety of seabirds but should not be directly affected by onshore development.

Moose and Caribou

No wintering or calving grounds within immediate site area.

Fisheries

In 1979 there were 31 inshore boats, 52 fishermen (12 manyears) a landed catch of 271,084 lbs. and a landed value jof $101,047. There is one fish plant operation. Fishing operations account for over 50% of the total labour force of 104.

Agriculture

Area unsuitable for agriculture.

Forestry

Minimal forest resource in area.

Recreation

No conflict between site and recreational use.

26. Acoustic and Visual Impact:

Minimal, site removed from settlement.

Social and Economic Considerations

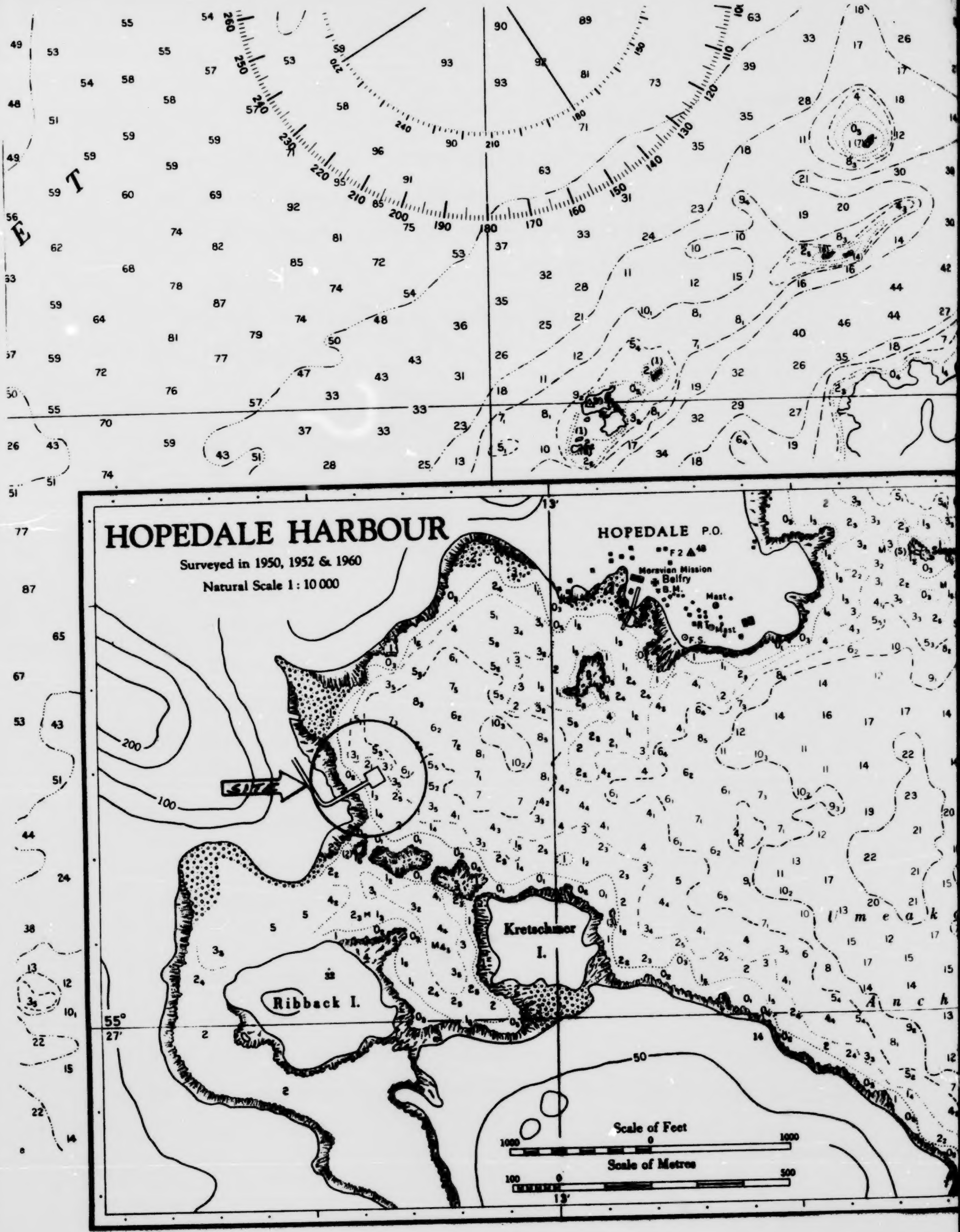
27. Given the small population, the lack of available infrastructure and the small unqualified local labour pool, the only way a supply base could be established in Hopedale would be to set up a complete self-contained community. Facilities would be expensive to install and there is very little level land available suitable for a development of this nature.

Pre-Conditions for Site Suitability

27. Site Development Costs: Prohibitive for a permanent Supply base. However, Hopedale will most likely continue as a staging area for exploration activities off the Labrador

coast. It is difficult to determine how much expansion in the present scale of activity will occur and what the impact in terms of local employment might be.

On Site Development Costs (Satellite Supply Base):
Upgrading of the existing water supply will be required or construction of a new system from a pond about three kilometres away. Site preparation and grading will be required to provide level foreshore land.

HOPEDALE HARBOUR
Surveyed in 1950, 1952 & 1960
Natural Scale 1 : 10 000
HOPEDALE P.O.
Moravian Mission
Belfry
B.H.
Mast
F.S.
SITE
Kretschmer I.
Ribback I.
55°
27'
13'
200
100
50
Scale of Feet
1000
0
1000
Scale of Metres
100
0
500

PRELIMINARY EVALUATION
LEWISPORTE
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE
b) MODULE FABRICATION AND ASSEMBLY

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

cation: LEWISPORTE

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	300 A	50-85' deep, sufficient	
- waveheight (3 ft.)		unlikely to exceed 3'	
- cargo wharf 33' draft (500 ft.)		use of CNR wharf	
- supply wharf 20' (900 ft.)		use of CNR wharf	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	110'	sufficient	
- channel width (800 ft.)	1200'	sufficient	
- approach depth (33 ft.)	9300'	sufficient	
- turning basin (1000 ft.)	2100'	sufficient	
FORESHORE AREA (20 A)	<20A	development possible	
INDUSTRIAL AREA (200 A)	<300A	compensates for lack of fore shore	
ICE FREE (5% interference)		possible prob. for 3 months	
PROXIMITY TO DEVELOPMENT	400 mi	further to Labrador site	4
TRANSPORT NETWORK			
- highway	10mi to T.C.H.	needs upgrading	7
- rail	yes	good connection	10
- air	Gander	35 miles	8
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools (200 vac.)	200+		5
- vocational schools	on site	Gander and Grand Falls	10
- medical facilities	clinic	Grand Falls Hosp. nearest	5
- housing (200)	120	infilling in Lewisporte	3
- power supply			10
- sewage disposal		system need upgrading	5
- solid waste disposal		incinerator could be used	10
WATER SUPPLY	excess	requires upgrading	5
QUALIFIED LABOUR		Total labour force 4045	
- construction (200)		1847 construction	10
- fabrication (100)		249 fabrication	10
LAND USE COMPATIBILITY		1052 fishermen, 60	
- fishing		processing	8
- forestry		local saw mills	4
- agriculture		some activity -not near site	10
- salmon rivers			10
- wildlife			2
CAPITAL COST			

LEWISPORTE

General Description

Lewisporte is located seven (7) miles north of the T.C.H. on the western shore of Burnt Bay, Notre Dame Bay. The town lies between Grand Falls (39 miles west) and Gander (35 miles east).

The area which has been proposed for supply/service base operations or module fabrication is at the southern end of the town immediately west of the intersection of Highway 342 and 340. The development area slopes gently in an easterly direction. The site area is scheduled for industrial development and contains approximately 60 ha or 150 acres. Adjacent lands to the north, west and south are vacant.

Lewisporte serves as a service centre for a number of smaller communities and represents approximately 50% of the area population (Little Burnt Bay, Embree, Lewisporte, Campbellton, Comfort Cove-Newstead, Lewisporte surrounding) of 7692 (1976 census). The site is not located on the waterfront and access between harbour and site would have to be designed to minimize community disruption. Lewisporte lies within reasonable commuting distance of two major population centres - Grand Falls and Gander.

Description of Harbour, Foreshore and Hinterland

1. Protected Harbour Area (headland to headland) min. 33 ft. draft	300 acres

2. Protected Area (Entire Bay)	Large
3. Channel Depths	110 ft.
Harbour Depth	50 ft. - 85 ft.
4. Channel Widths (33 ft.)	1200 ft.
Approach Entrance (33 ft.)	9300 ft.
5. Turning Basin (diameter at 33 ft.)	2100 ft.

6. Existing Wharfage and Docks:

- CNR Dock, length of 600 ft. with depths along side of 18 to 26 feet. Equipped with a 420 ft. x 70 ft. transit shed.

- Imperial Oil, length of 680 ft. and 350 ft. along outer face with depth alongside of 32 ft. at outer face.

- Old Imperial Oil Dock, length of 280 ft. with depth alongside of 19 ft. at outer face.

- Government wharf, length of 97 ft. with depth alongside of 9 ft. at outer face.

7. Ice Restricted Access:

There is ice in this area from late January to late April. The concentration is dependent upon the severity of the winter and is similar to Botwood.

8. Wave Restricted Access:

The site is well protected from adverse conditions associated with winds and waves from any direction. Occasionally winds may be of such magnitude to affect vessel movement.

9. Wind Direction and Speed:

Similar to Botwood.

10. Fog:

Offshore winds usually keeps fog over the open sea rather than inshore.

11. Currents: - Unknown

12. Tidal Variation:

The tide along the east coast is mixed but mainly semi-diurnal. Tides have an amplitude of 1.5 m (4.8 ft.) and would not hinder the docking and loading of tugs and offshore service vessels.

13. Seabed Conditions:

Mud, sand, gravel and rock. Good anchorage available.

14. Proximity to Drilling/Production Activity: - 400 miles.

15. Land Availability Foreshore:

It has been proposed that increased transhipment movements will be located around existing marine facilities. As in the case of St. John's, sufficient foreshore area is not available and would rely on road connection between industrial site and docking facilities.

16. Industrial Land Availability:

There is roughly 60 hectares (150 acres) of zoned industrial land available in the development area and at least another 50 hectares or more directly behind the CN docking facilities - CN rail yard which is used at present. Whether or not any additional use can be made is unknown.

17. Topography:

Lewisporte is situated on the lowlands of the western shoreline of Burnt Bay. The land surrounding Lewisporte is relatively flat, it slopes back from the water such that elevation of 100-200 feet are not attained in the majority of cases until more than 2000 feet from the water. The area is largely covered by bog underlain by rock or a veneer of till. The northern part of the development area may contain several metres of till on the hillside. To the east of this till zone, in the Southwest Brook river valley area, there is a thin and discontinuous desposit of sandy gravel with some sand layers.

Physical and Social Infrastructure

18. Water Supply:

The Town is served by a piped water supply from Stanhope Pond. Storage elevation is 40 m. The watermain nearest the site is an inadequate 150 mm pipe along Main Street which cannot provide fire flows for commercial or industrial uses. Proposals were made in 1979 to improve the system. The reservoir is to have a storage capacity in the order of 1300 m^3 (400,000 gallons) with a base elevation of 38 m. Existing system rated at 48,000 gal/hour.

19. Power Supply:

Power requirements for a supply base operation are minimal and can be provided through existing power supply by Newfoundland Light and Power Company.

20. Sewage Disposal:

The sewerage system consists of 17 separate gravity collection systems, each with an outfall to Burnt Bay. Existing capacity of system is unknown. A 1979 engineering study recommended collection at a central point for disposal and eventual treatment.

21. Solid Waste Disposal

Existing system is 300 m from major route (to Stanhope). A teepee incinerator was installed in 1978 with a design capacity for 5000+ population.

22. Housing:

The number of new families moving into the area would depend on the length and stability of the operation rather than on it size. Lewisporte presently has 120 infill sites available for single family housing. Two comprehensive development areas are designed in their municipcal plan for future residential development. These amount to 35 hectares.

23. Schools:

School enrollments indicate in a general way the size of existing facilities. There are presently 3 schools with 65 teachers and an enrollment of 1200. There is additional capacity for at least 200 students.

24. Vocational School:

There is a District Vocational School with an enrollment of 160. Additional schools are located at Grand Falls (40 miles) and Gander (35 miles).

25. Access to Medical Facilities:

There is only a medical clinic in Lewisporte with 4 physicians. There are two public health nurses and an ambulance service. The nearest regional hospital is located at Grand Falls (40 miles west).

26. Highway Access:

The site is located on Highway 340/Main Street which is a provincial highway connecting the port with T.C.H. 10 miles away. The segment south to the T.C.H. was described as inadequate in the Royal Commission on transportation. Road access to the Lewisporte waterfront is good but runs through the central business district and traffic congestion could be a major problem with heavy truck traffic through the area.

27. Rail Access:

The CNR branch line runs along the eastern edge of the proposed site. It joins the main CNR line seven miles south at Notre Dame Junction. The branch line leads to the CN wharf in the Lewisporte harbour. The CNR wharf is serviced by two sidings extending down each side of the shed to the end of the wharf. A third siding enters the shed and again runs its full length. From the wharf the tracks cross the Main Street and enters the main CNR yard where numerous other sidings are located.

28. Airport Access:

The nearest airport is Gander International, 35 miles east of Lewisporte.

Environmental Preview

29. Natural Environment:

The existing facilities in Lewisporte have created no environmental problems to date. Any expansion in foreshore facilities will likely have only a short term construction impact. The development area is vacant and adjacent lands to the north, west and south are vacant. There is no conflict in land use and little aesthetic value.

Wildlife:

Terrestrial wildlife is minimal and should not be directly affected by development. Seabirds are common but it is not anticipated that the development will affect them. There are no seabird sanctuaries in immediate area. There are no moose or caribou wintering or calving grounds in a 36 square mile management zone and Lewisporte accounts for only 7-9% of annual area kill.

Salmon Rivers:

There is no salmon resource entering site.

Forestry:

In 1980 there were 58 sawmilling operations in the catchment area (30 mile radius) with an estimated 3,805,000 fbm and an estimated employment of 126 manyears. Within immediate vicinity of site however there is no high priority forestry resource. The area is presently at the end of its five year plan. The next five years's plan is to maintain cut (35,000 cords) and reforest areas that are overcut.

Agriculture:

Lewisporte region from Brown's Arm to Comfort Cove has been designated as a medium priority area for agriculture development. Lewisporte is included in Unit 7 which is comprised of ten communities. There are presently two farms in Lewisporte.

Fisheries:

In 1980 there were 591 inshore boats operating in the development area, 1,052 fishermen (154 manyears) with a total landing of 17.8 million lbs. and a landed value of 1.9 million dollars. There is only one major processing operation which operates year round and employs 60 people.

Recreation:

No conflict between recreation use and proposed development.

30. Acoustic Change:

Temporary impact during construction. As development site fronts on route 340/Main Street which is partly developed with commercial uses. There could be a moderate increase in noise level if module fabrication does occur in the area.

31. Visual Aesthetics:

No adverse impact anticipated.

Social and Economic Considerations

32. Community Services:

The facilities in Lewisporte are adequate to present population base. As well, there is access to facilities in the larger centres of Grand Falls (39 miles west) and Gander (35 miles east). The strain on existing facilities would depend on the degree of in-migration associated with the proposed developments.

33. Demographic Change:

Lewisporte has a population of 3,782 (1976 census) but an area population of 7,692. Depending on the scale of operations and the number of commuters which might come from the Grand Falls and Gander areas population change could range from slight to moderate.

34. Labour Force Characteristics:

Labour force activity (1976) in the Lewisporte area (pop. 7,692) showed a total of 1790 with employed at 1485 and unemployed 305 and an overall participation rate of 44.4%. In 1978 the number of taxpayers for the same area were 2,262.

In order to get some indication of the skills of the unemployed, unemployment insurance figures for January, 1981, were used. These figures are given on a regional basis encompassing a much larger area than the Lewisporte subregion but do give an indication of available labour supply within commuting distance. Of the 4,216 persons registered 43.8% (1847) were listed as construction workers. 5.9% (249) as machinery and fabrication, and 14.1% (348) as transport equipment and material handling. There appears to be a sizeable labour supply to meet demands of both a service base activity and module fabrication. Again, this needs further analysis and would depend on scale of activity.

Pre-Conditions for Site Suitability

35. Constraints:

- road improvements will be required for access to waterfront.
- municipal upgrading package to go hand in hand with developers package.
- actual availability and capacity of existing harbour facilities which can be used for oil related development to be determined in relation to proposed scale of activity.
- if module fabrication proceeds then improvements to existing transportation links between site and assembly

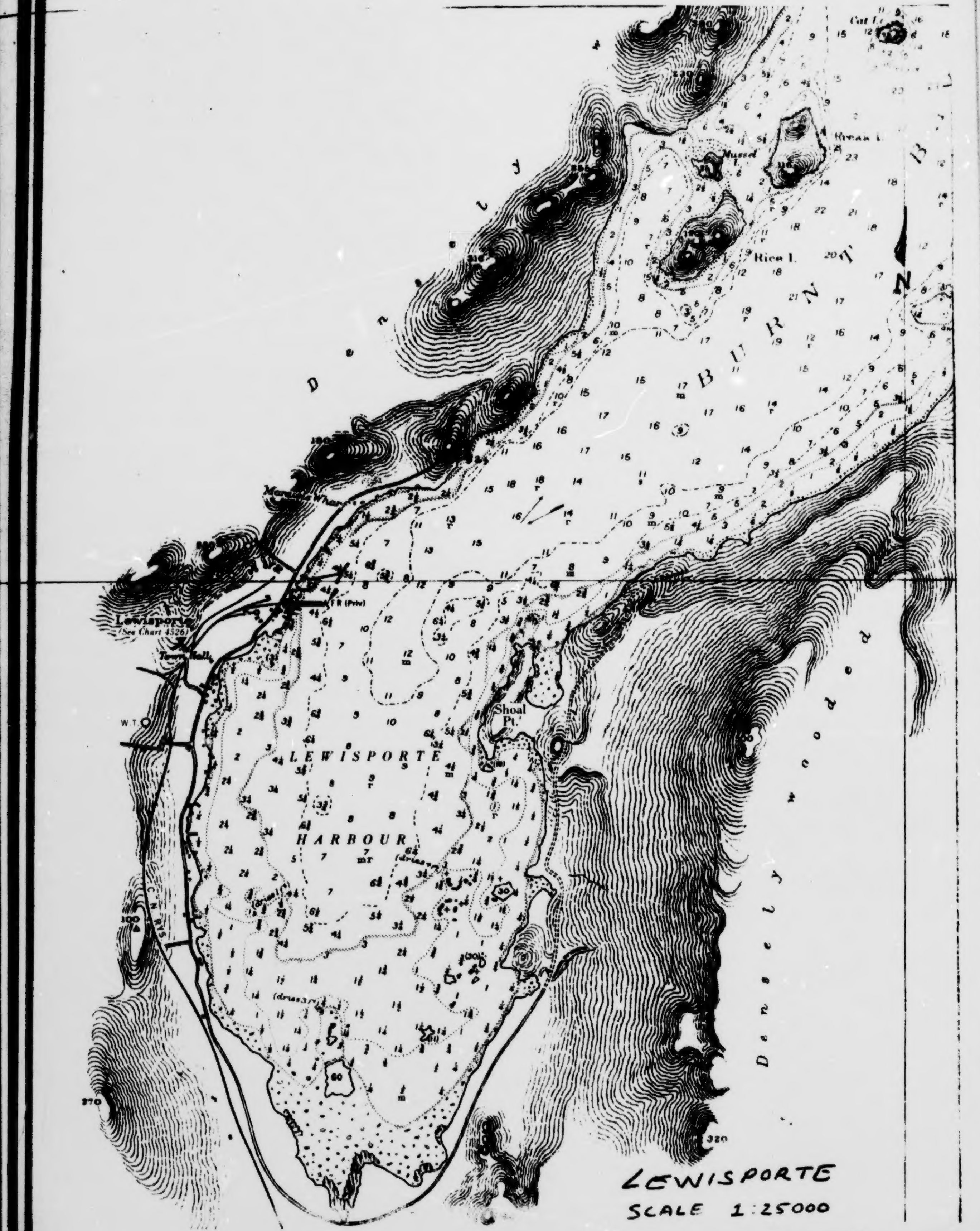
or shipment points will be necessary depending on size and weight of module structures.

- investigate impact of heavy truck traffic through downtown commercial zone (Main Street).

On Site Development Costs (Satellite Supply Base)

road upgrading to T.C.H.	$2,500,000
Contingencies	250,000
Total	$2,750,000

Other basic facilities are deemed adequate for this kind of development. The cost of providing internal industrial facilities, local and social services will be extra.


Cat I.
Mussel I.
Rice I.
B U R N T B
D e n s e l y w o o d e d
Lewisporte
(See Chart 4526)
Town Hall
F.R (Priv)
W.T.
Shoal Pt.
L E W I S P O R T E
H A R B O U R
(dries)
C N RYS
320
370
100

LEWISPORTE
SCALE 1:25000

PRELIMINARY EVALUATION
LONG POND, MANUELS
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

cation: LONG POND, MANUELS

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			
- protected area (150 A)	0	small area - very shallow	
- waveheight (3 ft.)	10'	fully sheltered in hr.	
- cargo wharf 33' draft (500 ft.)	510'		
- supply wharf 20' (900 ft.)	410'	to be built outside existing	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	27	being dredged	
- channel width (800 ft.)	<200		
- approach depth (33 ft.)	the bay		
- turning basin (1000 ft.)	800'		
FORESHORE AREA (20 A)	25A	limited access	
INDUSTRIAL AREA (200 A)		close to Octagon Pond ant St. John's	
ICE FREE (5% interference)		may occasionally need icebreaker	Critical
PROXIMITY TO DEVELOPMENT	250 mi		
TRANSPORT NETWORK			
- highway	poor rd.	planned by-pass would improve	5
- rail	1 mi. from site	use not envisaged at present	0
- air	St.John's		10
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools	no space		0
- vocational schools	Seal Cv.	and St. John's	10
- medical facilities		St. John's	10
- housing		local dev. at St. John's	10
- power supply		transmission line at 2 km	10
- sewage disposal		system being installed	10
- solid waste disposal		will be required	0
WATER SUPPLY		C.Bay S. - being installed	5
QUALIFIED LABOUR			
- **construction (200)**		close to St.John's 53,112	10
- **fabrication (100)**		379 fab., 1781 const.	10
LAND USE COMPATIBILITY			
- fishing		fish plant on site	5
- forestry		very small effort	9
- agriculture		some agri. land nearby	5
- salmon rivers		no salmon rivers	10
- wildlife		moose kill locally	6
CAPITAL COST			

LONG POND, CONCEPTION BAY

General Description

Lond Pond is located on the eastern shore of Conception Bay some 20 km drive from St. John's. Long Pond is one of the incorporated communities into the town of Conception Bay South. The general topography in the area could be classified as grently rolling with contours within the range of 0 to 30 metres. The proposed development site which was frozen is lying vacant, however it does border residential and institutional properties. Land and waterfront area adjacent to the eastern boundary is used by Texaco Marine and the government wharf. The principle user would be Newfoundland Minerals Limited who use the site for stockpiling concentrates and shipment of the same. The local and Royal Yacht Club use the outer and inner harbours respectively for their pleasure craft. It is thought this harbour is administered by the National Harbours Board.

Lond Pond is accessible from St. John's by the Conception Bay Highway and from the T.C.H. via the Foxtrap Access Road. Lond Pond is also accessible to the other side of Conception Bay through the Conception Bay North Shore road.

The site chosen for development is bounded by Conception Bay on the north, Texaco Marine on the east, residential property on the south and Breakwater Road on the west. The frozen area contains 27 acres of land, more or less. The municipality of

Conception Bay South and the unincorporated community of Foxtrap have jurisdiction over the site although little control is exercised especially by the latter. It would appear small parcels of the land are cultivated and a small graveyard may lie on the frozen land.

The population of Conception Bay South numbers about 11,000 people and includes the communities of Seal Cove, Lond Pond, Manuels, Foxtrap, Kelligrews, Upper Gullies, Chamberlains and Topsail. The site falls within the commutershed of greater St. John's with a population of over 140,000.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland @ 33 ft. draft)	0 acres
2.	Protected Area (Entire Bay)	0 acres
3.	Channel Depth	27 ft. (dredging in process)
	Harbour Depth	27 ft. (dredging in process)
4.	Channel Width (@ 33 ft.)	0 ft.
	Entrance Width (@ 33 ft.)	0 ft.
5.	Turning Basin Diameter (@ 33 ft.)	0 ft. 8800 (Conception Bay)

6. Existing Wharfage and Docks:

No suitable leased or private wharves. One public wharf with a length of 510 ft. and dredging in process should yield a depth of 27 ft. Estimated allowable loading @ 200 psf.

7. Ice Restricted Access:

Pack ice may occur in Conception Bay between mid January to March with natural clearing occurring between mid March to April 20th. The duration of ice pressure is normally short. Based upon statistics for the 1960-1980 period the mean annual duration of ice of 1/10 or greater concentration in the approaches to Conception Bay is 18 days. Most of the supply vessels now operating are ice reinforced and would be able to operate 90% of the time with an ice concentration of 1/10 or greater. When operating under these conditions trip time would obviously be increased. In Conception Bay dense drift ice can occur if there is a general trend for the pack ice to remain close to shore. Northeast winds would tend to move the pack ice onshore and these conditions would worsen with long duration onshore winds. The prevailing westerly winds tend to make the ice conditions more severe on the eastern side of Conception Bay. Under conditions of high ice concentration with strong onshore winds ice breaker assistance could be required.

8. Wave Restricted Access

Wave height at the entrance to Spaniards Bay has been stated at 18 feet. The greatest fetch in Conception Bay would be in the northeast direction or parallel to the axis of the bay. Consequently waves would tend to be greatest with N.E. winds which are estimated to occur some 5 to 15% of the time with an average maximum velocity of 18.3 m.p.h. It is thought the presence of Kelly's Island and Bell Island would provide some protection from these winds. Wave height adjacent to Long Pond is estimated at 10 feet and 0 feet within the harbour. Littoral drift is thought to be negligible.

9. Wind Direction and Speed:

Westerly winds prevail along the east coast of the island with gale force winds (57.5 to 101 km/hr.) occurring some 5 to 6% of the time. Due to the location of Long Pond winds from the N.W. to N.E. which occur some 14 to 32% of the time with an average maximum velocity of 18.3 m.p.h. would probably be of most concern.

10. Fog:

Fog occurs during May, June and July. Prevailing westerly winds which occur some 34 to 53% of the time during these months assist in providing better visibility onshore as opposed to offshore.

11. Currents:

Geographical and tidal conditions in Conception Bay are not conducive to producing significant longshore currents. There are no large rivers near Long Pond which could create even local currents. Obvious tidal currents exist within Long Pond harbour itself.

12. Tidal Variation;

The amplitude for large tides are in the order of 5.1 ft. Tides of this magnitude are not considered significant in the operation and loading/unloading of tugs, offshore supply boats and cargo ships.

13. Seabed Conditions:

General seabed conditions consist of sand and silt overlying bedrock. In the vicinity of the public wharf deposits of sand and organic silt overlying bedrock composed of weathered and sound shale exist.

14. Proximity to Drilling/Production Activity:

Long Pond is in the order of 250 miles from the Hibernia discovery.

15. Foreshore Land Availibiity:

It would appear the frozen foreshore area is slightly in excess of that required. However this amount is not deemed to be large considering a small pond occupies approximately 2½ acres of the original 27 acres and this may be further reduced to avoid the graveyard. The foreshore land is relatively flat with contours of 0 to 5 metres (approximately). Several small parcels appear to be used for private vegetable gardens. It is understood a planned expansion of the ore concentrate storage area is in the works. Access to the site is available through Breakwater Road and through a second local street.

16. Industrial Land Availability:

Since the available foreshore area is limited to the basic requirement Long Pond would have to complement the module fabrication centre at Octagon Pond. In this sense the site will have adequate industrial land.

17. Topography (surficial geology):

The soil with respect to agriculture tends to be firm, shaley, clayey loom to gravelly, stoney and sandy loom with gentle to moderate slopes. Drainage is moderate to rapid. Agriculture limitations are due to climate, topography, stones and rock.

Geology in the Long Pond area is of the Cambrian age containing dominate shales with limestone, conglomerate, siltstone, sandstone, minor volcanic rocks and manganese beds. Surficial geology indicates the Long Pond - Manuels area is comprised mostly of sandy till possibly up to seven metres thick. The major constituents are as follows: gravel - 68%, sand - 27% and silt/clay - 5%. Although subsoil stability is expected the coastline is subjective to erosive action.

Physical and Social Infrastructure

18. Water Supply:

A water supply system for the entire town of Conception Bay South is in the works. At present there is no industrial or potable water supply to the site and it will be sometime in the future before this service is available on site. It is possible construction may be accelerated.

19. Power Supply:

As far as can be gathered electrical power is not available at the existing dock. However, it is known that a transmission line is located some 2 km beyond the site and Long Pond itself does have an electrical power supply. Consequently it should not constitute a major problem to provide electrical power both on the frozen foreshore land and at dockside. This is seen as a problem in co-ordination with the Utility company or corporation and finance.

20. Sewage Diposal:

At present a municipal sanitary sewage system or storm water system is not available at the Long Pond site. The construction of a sanitary sewer system has begun for Conception Bay South area and Long Pond will be serviced at the appropriate time. If it was required this system may be accelerated. Storm sewer effluent will most likely be discharged into Conception Bay. Sanitary sewer effluent could also be discharged in Conception Bay if the municipal system provides timing problems.

21. Solid Waste Disposal:

A solid waste disposal site will be required for a permanent supply/service base in the Long Pond area. The town of Conception Bay South would possibly have a municipal dump but it is thought a separate facility will be required.

22. Housing:

The number of new families moving into the area or the number of new housing units required would depend upon the length, stability, size of the operation, commutershed available and the number of locals employed who already have acceptable housing. The town of Conception Bay South is growing rapidly and residential land is being made available. It is understood most of the lots are available on an unserviced basis while some lots may be serviced with water and sewer under phase I of the water and sewer system.

23. Schools:

The existing elementary and high schools in Conception Bay South are either over-crowded or filled to capacity. Some sources indicate the growing community is placing a large demand on existing facilities. While some expansion is planned this is expected to keep pace with traditional growth only and any large influx of students would require additional facilities.

24. Vocational Schools:

Not far from Long Pond a district vocational school is located at Seal Cove and this school provides limited courses in industrial trades. The Bell Island district vocational school is off a similar type. St. John's can offer vocational education through the College of Trades, marine education through the College of Fisheries and Marine Engineering. St. John's also contains a modern university. The development at Long Pond would provide easy access to graduates from these facilities.

25. Access to Medical Facilities:

The Conception Bay South area does not have access to a local hospital facility although there are some practicing physicians in the area who have established local clinics. It should be pointed out however that this area is well servied by major medical facilities within St. John's. These facilities in St. John's have 335 physicians, 37 dentists, 1762 beds, 36 public health nurses with ambulance service and a number of specialized units or services available.

26. Transport Systems:

Long Pond is accessible to the Trans Canada Highway via Route 61, the Foxtrap Access Road, and through route 90 or 62 through Holyrood. Existing access from St. John's is on the Conception Bay Highway which is over congested and in poor order with low speeds mainly due to proximity to housing and poor alignment. The connection to the industrial park at Octagon Pond, St. John's Harbour and Torbay Airport would be over this route until the proposed Conception Bay South By-Pass is constructed. Construction of this facility is expected to cost some $20,000,000 (approximately) but no schedule has been set. Property has been purchased and right-of-way cut for one-half of this road but funds are not available although it is of high priority.

Rail access is not available directly on site but the main line passes beyond Long Pond a distance of one km. from the site. The eastern terminal is located at St. John's some 15 km away. At this time use of this transportation mode is not expected.

The nearest commercial airport would be that administered by M.O.T. at Torbay. Torbay Airport is approximately 20 miles from Long Pond. This airport has regional and national status while international flights must land at Gander. Regularly scheduled passenger and/or cargo flights are provided by EPA and Air Canada. Several small light aircraft and helicopter services are also available at this airport.

St. John's is serviced by regularly scheduled cargo ships from Montreal and/or Halifax.

Environmental Preview

29. Natural Environment:

The frozen area is mainly covered with natural grasses and the occasional shrub. Parcels of the property are under cultivation during the summer although this is restricted by soil, climatic and topographic conditions. A small graveyard is also located on or near the site. The area does not support wildlife of any sort due to residential proximity and rare plants are not known to the area. No significant aquatic resources are reported to exist in the pond located on site.

The land surrounding Long Pond is deemed to have moderate capability for forestry, moose and caribou although none of these are important on site. Some 38-43 moose were killed within management area 35 during 1976 to 1979 and the kills are thought to occur in the remote areas. No records are available for caribou kills in the northern Avalon. Consequently development at Long Pond is not deemed to create any adverse environmental impacts.

Salmon are not reported to exist in Manuels River and the same is extrapolated for Conway Brook which flows into Long Pond Harbour. Since significant dredging has occurred here and due to the lack of marine resources severe marine impacts should not occur.

Seabirds and Waterfowl

Seabirds are the most vulnerable of the natural species which could be affected by oil development. While there are a variety of seabirds and waterfowl in Conception Bay all species use coastal regions for feeding purposes. Major damage could result in the event of an oil spill.

This area is not considered a productive habitat for waterfowl nor is it a seabird sanctuary.

Fisheries

Within a 30 mile radius of Long Pond - Manuels nearly

90 million pounds of fish were landed for a value in excess of $9,000,000 during 1979. This was accomplished with a 235.5 manyear effort comprising some 1115 fishermen. Boat sizes ranged from less than 20 feet to offshore vessels in St. John's with some 658 fishing craft involved in the industry.

Agriculture

Generally speaking this area of the Avalon has been rated low on land priority for agriculture with pockets of high priority. An agriculture development area has been frozen about one mile southwest of Long Pond - Manuels and extends to Paddy's Pond in the east. While some private farming does exist it is not commercial. The land does have climatic, topography, rock and stones as negative factors with respect to farming. The soil conditions are outlined to a greater extent in Topography (surficial geology) Article 17 of this paper. Although there are no conflicts with the proposed agriculture freeze government sources do not want to see agriculture activities destroyed which do exist.

Forestry

During 1980 there were some 980,000 f.b.m of lumber produced within a 30 mile radius of Lond Pond which created some 32 manyears of employment. The general area has a moderate capability for forestry with an average of 30 to 50 cubic feet per acre per year. The proposed foreshore area does not have any forestry resource and the Department of Forestry has no interest in this area.

Recreation

Generally speaking the land surrounding Long Pond has low capability for recreation. However, it should be pointed out the local and Royal Newfoundland Yacht Clubs use the outer and inner harbours of Long Pond respectively specifically for mooring pleasure craft. There could be some conflict with local boaters in the outer harbour and shipping companies with regard to usable harbour area and between both yacht clubs and the shipping companies with regard to access to and from the harbour in the interest of safe movement.

However, it should be pointed out significant expansion would have to occur before a permanent supply/service base could be operational including dredging from 25 ft. to 33 ft. Consequently Long Pond is seen more as an overflow area for supply/service boats however there could very well be some conflict between local users and shipping companies.

30. Acoustic Change:

The proposed development can be expected to create some acoustic interference to residents and school students along the western and southern boundaries. However, with proper use of sound absorbing materials and sufficient buffer zones it is thought a large portion of the interference could be eliminated. Since the area is already developed, i.e., Conception Bay Highway and shipping, receiving, storage centre, noise is already present.

When considering Long Pond as an overflow for St. John's it is thought most of the noise generated will stem from vehicle movements and operation.

31. Visual Aesthetics:

The area is already used for storage of ore concentrates and oil products. Consequently, development of the area with regard to supply/service base operation and impact on the visual senses are not as severe as opening virgin ground. Some impact will of course be generated but it is thought this can be reduced by creation of sufficient buffer zones with aesthetic appeal. This may go hand in hand with acoustic interference.

Social and Economic Considerations

32. Community Services:

The proposed site generally lies within the commutershed of Holyrood and St. John's where a very wide range of facilities are available. The stress on existing facilities and the desire to have additional facilities will to a large extent depend upon the degree of in-migration for the proposed development.

33. Demographic Change:

Given the population base of the Conception Bay South area (approaching 20,000) and the population of St. John's it is anticipated the change in population would be small.

Due to the mobility of the Newfoundland worker the effect will be spread over the entire region.

The majority of people living in the area work in the retail and service industry with many commuting to St. John's on a daily basis.

34. Labour Force Characteristics:

In 1978 there were some 1114 taxpayers in the Long Pond locality with an average income of $10,702. The greater Long Pond area contained some 53,112 taxpayers with an average income of $12,793.

Unemployment statistics for the Long Pond area as of January 22, 1981, contained some 2812 and 4870 unemployed female and males respectively. A further breakdown of this group indicates some 20% or 1950 were clerical and administrativ personnel, machinery and fabrication were 5.0% or 370 people, construction at 23.7% or 1781 people unemployed and some 3.2% or 242 people in material handling with the remainder split amongst various operations.

Pre-Conditions for Site Suitability

35. Constraints:

- construction of an access road to link Octagon Pond, St. John's Harbour and Torbay Airport.
- consider the impact with particular regard to acoustic and aesthetic factors upon the school and surrounding residents.
- municipal upgrading package is required to go hand

in hand with the proposed development, especially for water and sewer services.

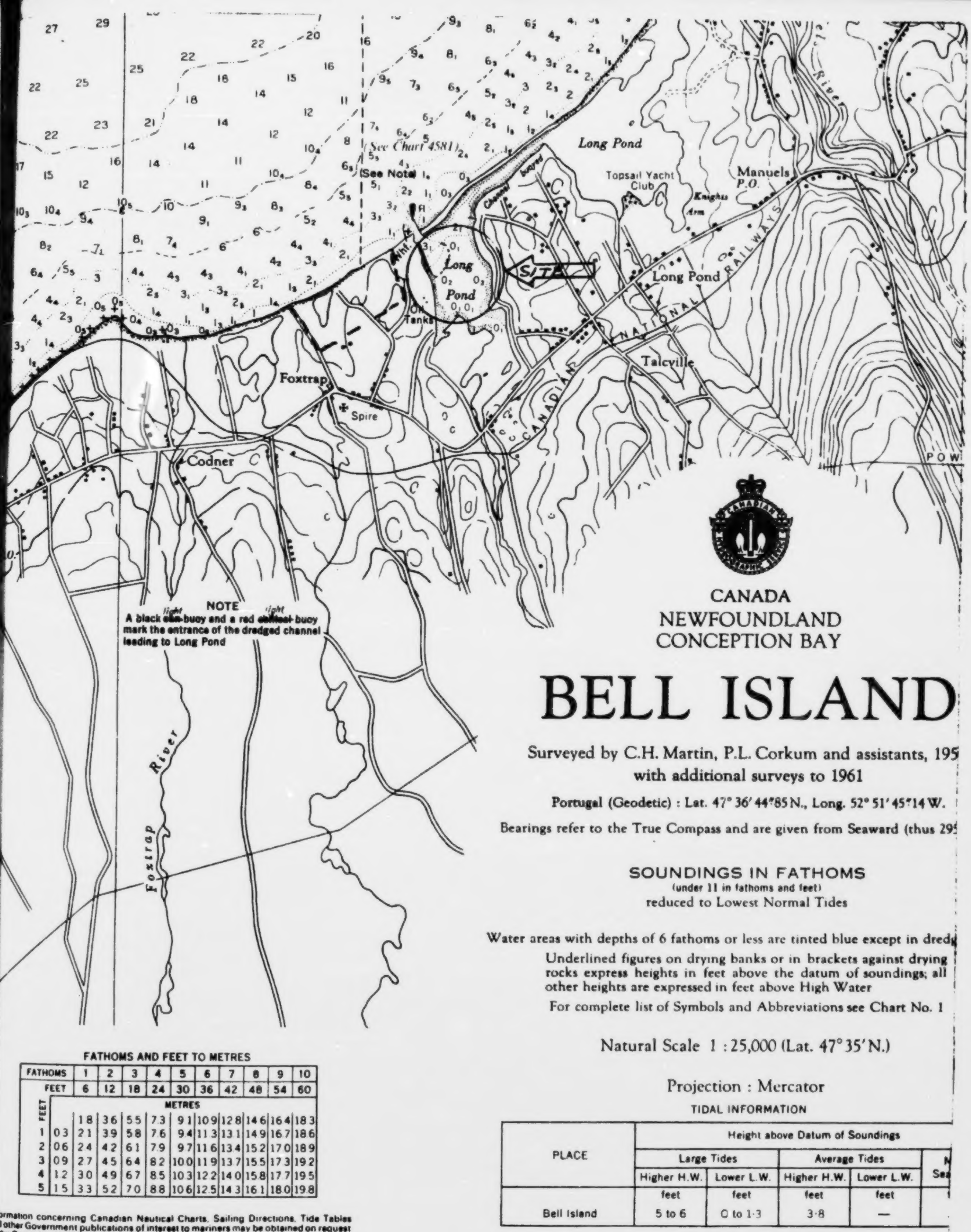
- municipal intergration of the entire area including Foxtrap and Seal Cove being brought under the jurisdiction of Conception Bay South Town Council.
- effective zoning regulations should be implemented and followed.
- regional survey of existing capacity of land and social services required to pinpoint public facilities which could be put under strain by additional development, especially the educational facilities.
- development should go hand in hand with the St. John's Harbour, Octagon Pond and Torbay Airport with a co-ordinated development effort to ensure smooth development.
- alternative facilities and/or compensation may have to be provided to one or both yacht clubs using the existing harbour due to a disruption of mooring facilities and possible conjestion of the harbour entrance and/or channel.
- disruption or elimination of land cultivated for private use will require compensation.
- a small cemetery is local adjacent to the frozen area or overlapping the same.

- power supply and utility services must be made available to the site for industrial purposes.
- solid waste disposal site must be found.

36. Facilities Required:

- construction of Conception Bay South By-Pass to Manuels	$ 11,500,000
- construction of water line	1,650,000
- construction of harbour facilities	4,500,000
- contingencies	850,000
Total	$ 18,500,000

The cost of development and internal servicing for the industrial area must be added to the above.



NOTE
A black ~~can~~ light buoy and a red ~~conical~~ light buoy mark the entrance of the dredged channel leading to Long Pond

CANADA
NEWFOUNDLAND
CONCEPTION BAY

BELL ISLAND

Surveyed by C.H. Martin, P.L. Corkum and assistants, 195
with additional surveys to 1961

Portugal (Geodetic) : Lat. 47° 36′ 44″85 N., Long. 52° 51′ 45″14 W.

Bearings refer to the True Compass and are given from Seaward (thus 29

SOUNDINGS IN FATHOMS
(under 11 in fathoms and feet)
reduced to Lowest Normal Tides

Water areas with depths of 6 fathoms or less are tinted blue except in dred

Underlined figures on drying banks or in brackets against drying rocks express heights in feet above the datum of soundings; all other heights are expressed in feet above High Water

For complete list of Symbols and Abbreviations see Chart No. 1

Natural Scale 1 : 25,000 (Lat. 47° 35′ N.)

Projection : Mercator

TIDAL INFORMATION

PLACE	Height above Datum of Soundings				
	Large Tides		Average Tides		Sea
	Higher H.W.	Lower L.W.	Higher H.W.	Lower L.W.	
	feet	feet	feet	feet	
Bell Island	5 to 6	0 to 1·3	3·8	—	

BENCH MARK
The datum of this chart is 14·95 feet below a bronze tablet cemented in the foundation o supporting truss of the Dominion pier ore carrier on Bell Island.

LONG POND

FATHOMS AND FEET TO METRES

FATHOMS		1	2	3	4	5	6	7	8	9	10
FEET		6	12	18	24	30	36	42	48	54	60
FEET	METRES										
		1 8	3 6	5 5	7.3	9 1	10 9	12 8	14 6	16 4	18 3
1	0 3	2 1	3 9	5 8	7.6	9.4	11 3	13 1	14 9	16 7	18 6
2	0 6	2 4	4 2	6 1	7 9	9 7	11 6	13 4	15 2	17 0	18 9
3	0 9	2 7	4 5	6 4	8 2	10 0	11 9	13 7	15 5	17 3	19 2
4	1 2	3 0	4 9	6 7	8 5	10 3	12 2	14 0	15 8	17 7	19 5
5	1 5	3 3	5 2	7 0	8 8	10 6	12.5	14 3	16 1	18 0	19 8

ormation concerning Canadian Nautical Charts, Sailing Directions, Tide Tables d other Government publications of interest to mariners may be obtained on request the Dominion Hydrographer, Canadian Hydrographic Service, Department of the vironment, Ottawa.

nadian "Notices to Mariners" published weekly, contain important navigational ormation including amendments to Canadian Charts, Sailing Directions, Lists of ghts and Lists of Radio Aids. These "Notices" may be obtained free on request to Ministry of Transport, Ottawa

PRELIMINARY EVALUATION
MAIN BROOK
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

ation: MAIN BROOK

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	300A	suitable	
- waveheight (3 ft.)	3 '	"	
- cargo wharf 33' draft (500 ft.)		required	
- supply wharf 20' (900 ft.)		required	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	39'	suitable	
- channel width (500 ft.)	300'	less than minimum	
- approach depth (33 ft.)			
- turning basin (1000 ft.)	1200	adequate	
FORESHORE AREA (20 A)	>20A		
INDUSTRIAL AREA (200 A)	>200A	to be developed	
ICE FREE (5% interference)		Dec-April ice season not suitable.	
PROXIMITY TO DEVELOPMENT			2
TRANSPORT NETWORK			
- highway	unpaved	needs development	0
- rail	none		0
- air		St. Anthony 50 miles	0
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools		no space	0
- vocational schools			0
- medical facilities		St. Anthony	0
- housing		nothing developed	0
- power supply	diesel		0
- sewage disposal		to be developed	0
- solid waste disposal		to be developed	0
WATER SUPPLY		may require modification	5
QUALIFIED LABOUR		Total labour 660	
- **construction** (200)		small labour force 265 const.	10
- **fabrication** (100)		10 fabrication	1
LAND USE COMPATIBILITY			
- fishing		inshore fish processing	8
- forestry		good potential to grow	8
- agriculture		no potential	10
- salmon rivers		Main Brook river	9
- wildlife		seabird colony moose	7
CAPITAL COST			

MAIN BROOK

Main Brook is a small logging-lumbering town located in Hare Bay, White Bay. The population was 551 in 1976. Main Brook has been nominated as a "staging area" or "forward supply base", that would be used for the storage of tubulars, mud, cement, fuel, etc., being used by exploration drill-ships working off the Labrador coast. The concept of a "forward supply base" is that the materials described above would be delivered by commercial marine carriers (such as C.N.Marine) and kept there to be picked up by offshore supply boats as required. This would have the advantages of having bulk materials available in relative proximity to the drilling operation, thus minimizing delays and down time, and also of getting more effective utilization of supply boats because of their shorter haul.

It is not expected that this activity would be highly labour-intensive, with probably about 10 to 15 part-time shoreside jobs being involved. Therefore, it can be assumed that the socio-economic impact of such a development would be negligible. If the level of activity were to increase, it should be noted that the several settlements within easy commuting distance have a combined population of 3560 people, and all have a high unemployment rate.

Description of Harbour, Foreshore and Hinterland

1. Protected Area	300 acres

2. Water Depths	
(a) at wharf	25 - 27 ft. @ LWOST
(b) approach channel	39 ft. @ LWOST
3. Channel Width (@ 33 ft. draft)	300 ft.
4. Turning Basin diameter (@ 33 ft. draft)	1200 ft.

5. Existing Wharfage:

Public wharf, timber pile construction with a concrete deck. 25' - 27' alongside at LWOST.

6. Ice Restricted Access:

Freezes from mid December through mid April. Offshore pack ice normally occurs March through May.

7. Wave Restricted Access:

Site is completely sheltered, so wave action is minimal.

8. Currents:

1-2 knots. Direction varying with tidal flow.

9. Tidal Variation:

Approximately 4½ feet.

10. Seabed Conditions:

Soft silt overlying clay and sand.

11. Land Availability (Foreshore):

There is an adequate foreshore available, in excess of 20 acres. The land is level, and has been, to a considerable extent, cleared of vegetation and overburden. The land in question belongs to Bowaters Ltd., and was formerly used for a pulpwood storage area. The foreshore area is adequate for any industrial requirement that might develop.

Physical and Social Infrastructure

12. Water Supply:

The existing system is relatively new but not functioning. Another new system will be on stream by the spring of 1981 and should have a capacity which exceeds domestic consumption by a factor of seven. Unfortunately additional pumping and storage may be required to reach to proposed site which is 2.4 km from the water main.

13. Power Supply:

Power in Main Brook is supplied by diesel generators with a 432 KV. Consumption is presently running a 200 KV.

14. Sewage Disposal:

There is no system available.

15. Solid Waste Disposal:

The only site within 20 miles is the one being used by the town of Main Brook.

16. Housing:

There are over 100 dwelling units in the community but no vacancies. A small boarding house with 8 rooms is available for commercial accommodation.

17. Schools:

There is an elementary school and a high school in Main Brook and 8 other schools in the area.

18. Vocational Schools:

N/A

19. Highway Access:

Main Brook is linked to the Great Northern Peninsula Highway at Plum Point by Provincial Highway No. 423 which is unpaved and 79 km long. The distance from Plum Point to St. Anthony is a further 150 km but the surface of Great Northern Peninsula is paved.

20. Rail Access:

There is no rail access to Main Brook and the nearest point is at Deer Lake 380 km distant.

21. Airport Access:

The nearest airport is at St. Anthony which is 230 km away by road.

Environmental Preview

22. Natural Environment:

The site is approximately 2 km southeast of Main Brook which is a salmon river. In 1979, 375 salmon were taken from Main Brook. Main Brook is within Moose Management Zone 1A which has a small population estimated at 120 animals in 1978. Approximately 5 km from the proposed site there is a sanctuary for a seabird colony.

Fisheries

In 1979 the total landing by fishermen in Main Brook were in excess 6.2 million pounds with a value of $1.0 million. There are 227 licenced boats and the majority of these are 20-35 ft. in length with 13 boats longer than 46 feet.

Agriculture - no conflict.

Forestry - no conflict.

Recreation - no conflict.

23. Acoustic Impact: - minimal.

24. Visual Impact: - previously used by Bowaters for log shipment.

Social and Economic Considerations

The socio-economic impact would be almost negligible as the scale of activity is low. If the activity level increased there is a combined population of 3,560 people within commuting distance of the site and a labour force population of 660 (1976).

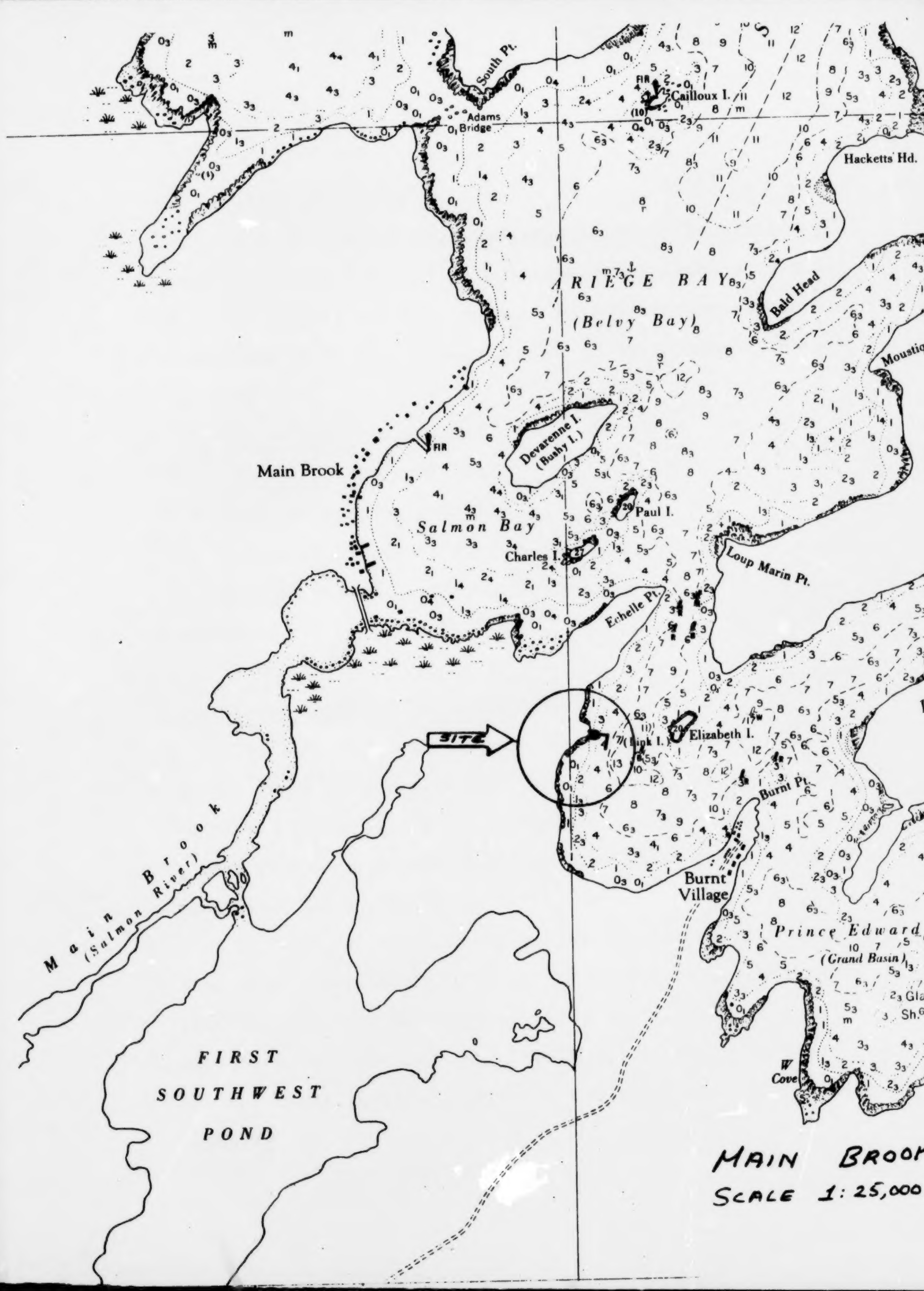
In January, 1981, unemployment figures for the commuter-shed showed an unemployment of 726 people of which 36.7% (265) were listed as construction workers; 1.4% (10) as machinery and fabrication. The skills of the unemployed are not traditionally related to the skills of the offshore industry.

Pre-Conditions for Site Suitability

(Part-time operation only)

Site Development Costs

Water System		$ 685,000
Site Access Road 15 miles Main Brook to Relocated Route 430		$6,000,000
	Total	$6,685,000


South Pt.
Adams Bridge
Cailloux I.
Hacketts Hd.
ARIEGE BAY
(Belvy Bay)
Bald Head
Moustic
Main Brook
Devarenne I. (Bushy I.)
Paul I.
Salmon Bay
Charles I.
Loup Marin Pt.
Echelle Pt.
SITE
Elizabeth I.
(Fink I.)
Burnt Pt.
Burnt Village
Prince Edward
(Grand Basin)
Gla
Sh.
W Cove
Main Brook (Salmon River)
FIRST SOUTHWEST POND

MAIN BROOK
SCALE 1: 25,000

PRELIMINARY EVALUATION
MORTIER BAY/SPANISH ROOM
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE
b) STEEL PLATFROM CONSTRUCTION
c) MODULE FABRICATION AND ASSEMBLY

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

cation: MORTIER BAY/SPANISH ROOM

Physical and Economic (critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	2300'	harbour depth 250'	
- waveheight (3 ft.)	2-3'	suitable	
- cargo wharf 33' draft (500 ft.)		none in place	
- supply wharf 20' (900 ft.)		"	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	110'	adequate	
- channel width (800 ft.)	2100'	"	
- approach depth (33 ft.)	>110'	"	
- turning basin (1000 ft.)	7500'	·800' in Spanish Room	
FORESHORE AREA (20 A)	>20A	will require some grading	
INDUSTRIAL AREA (200 A)	>200A	development needed	
ICE FREE (5% interference)		no problems anticipated	
PROXIMITY TO DEVELOPMENT	325		6
TRANSPORT NETWORK			
- highway		upgrading of access	7
- rail		none	0
- air	St.John's	-Gander-local small aircraft strip	0
SOCIAL AND ENVIRONMENTAL (ranked)			
EXISTING INFRASTRUCTURE			
- schools (200 vac.)	100 vac.	capacity for 100 extra	3
- vocational schools	on site	emphasis on pipefitting,mach.	10
- medical facilities	3 hosp.	planned regional hospital	7
- housing	450	infilling in serviced areas	10
- power supply		to be connected	5
- sewage disposal		develop at site	0
- solid waste disposal		develop at site	0
WATER SUPPLY	excess	needs connection to site	5
QUALIFIED LABOUR			
- construction (200)	8367	large skilled labour pool	10
- fabrication (100)		844 const., 113 fab.	10
LAND USE COMPATIBILITY			
- fishing		major offshore fishing centre	0
- forestry		almost no forest industry	10
- agriculture		some potential for increase	5
- salmon rivers			10
- wildlife			7
CAPITAL COST			

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: MORTIER BAY/SPANISH ROOM

A. Physical and Economic (critical)	Actual	Remarks	Rank
1. SHELTERED PROTECTED HARBOUR			
- cargo wharf 600' at 33'	2300A	suitable required dev.	
- dock 350' at 40'	50'	" "	
- Buildup Pier 400' at 40'	50+'	" "	
- Assembly Area	400+'	" "	
- Tow out min. 40'	100'	min. width 3000'	
Harbour depth 115' - 130'	300'	" "	
- Waveheight less than 3'	2-3'		
2. FORESHORE AREA 20 ha (50 acres)		prob. adequate when dev.	
3. INDUSTRIAL AREA 60 ha (150 acres)	>200A	development needed	
4. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL		Same as Supply/Service Base	
1. EXISTING INFRASTRUCTURE			
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR		large skilled labour	
- **construction** (350)	844	pool 8367	1
- **fabrication** (700)	113	844 const., 113 fab.	
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COST			

MORTIER BAY

General Description

Mortier Bay is located on the southeast side of the Burin Peninsula. The Spanish Room Peninsula which has been nominated for supply/service base operations and steel platform construction is located within the Marystown Planning Area but not within the town boundary. The site lies in the centre of the most densely populated area of the region containing five large towns all in easy commuting distance of the site. The largest town, Marystown, is located adjacent to the site and has a population of 5,915 (1976) census); Burin with 2,892; Fortune with 2,258; Grand Bank at 3,802 and St. Lawrence with 2,258 for a total population of 17,273. Marystown accounts for approximately 35% of the total population of the five towns. Marystown is connected by the Burin Peninsula Highway (100 miles) to the T.C.H. and is 220 miles from St. John's. Marystown occupies a dominant position in the regions economy and has a market base of about 12,000 people. In 1976 the regional population was nearly 29,000.

The Spanish Room Peninsula itself lies 4 miles northeast of Marystown and has approximately 50 families (350 population 1976). Total area for the proposed development is estimated at 310 acres and includes Spanish Room Point, Cow Head and adjacent lands.

Description of Harbour, Foreshore and Hinterland - Spanish Room

1.	Protected Area (33 ft. draft) (headland to headland of Mortier Bay)	2300 acres
2.	Protected Area (Spanish Room Cove)	100 acres
3.	Channel Depth (to Mortier Bay)	110 ft.
4.	Channel Width (to Mortier Bay) (33 ft. draft)	2100 ft.
5.	Turning Basin	7500 ft./800 ft.
6.	Existing Wharfage and docks (Information for Marystown available)	none
7.	Proposed new site (Spanish Room)	water depths along shore
	Harbour Depth (Spanish Room Cove)	35 ft. - 70 ft.
	(Mortier Bay)	250 ft.

8. Ice Restricted Access:

Ice free, though local drift ice can occur in February and March.

9. Wave Restricted Access:

Maximum wave height 2 ft. - 3 ft.

10. Wind Direction and Speed: (attached)

11. Currents:

Maximum 2-3 knots. Direction varies with tide.

12. Tidal Variation:

Tidal range 8.3 ft. (springs).

13. Seabed Conditions:

Predominantly mud with some grave and occasional rock.

14. Proximity to Drilling/Production Activities: - 302 miles

15. Land Availability (Foreshore):

The foreshore area is hilly and irregular, land is in excess of 20 ha required but a substantial amount of grading will be required to level area for development.

16. Industrial Land Availability:

The hinterland is rocky and hilly. There has been no previous industrial development in area. Quantity of land available is sufficient but extensive land development required.

17. Site Development Cost:

It is estimated by DAC that their Phase I development (Supply/Service Base, "mating" of decks to substructures of semi-submersibles) will cost approximately $30 million, with about $10 million of this amount representing the cost of marine facilities.

Physical and Social Infrastructure

18. Water Supply:

No water supply system in Spanish Room Peninsula. Marystown's watershed is 2¼ square miles in area and has a capacity of 7.5 mgd. Present consumption is 2 mgd. Only 64% of town is presently serviced by system. There is sufficient excess capacity to meet the 1-2 mgd. required by the supply base and fabrication operation but lines would have to be extended to Peninsula.

19. Sewage Disposal:

Sewage disposal should not present any problems as site is on waterfront. Treatment may be required, however. In addition, if any substantial population were to be accommodated the existing sewage system would need to be completed. At present only 36% of Marystown is served by public sewer.

20. Solid Waste Disposal:

It has been assumed that a separate landfill area of approximately 9 ha would be required.

21. Housing:

There are approximately 1,281 dwelling units in Marystown (1976). Residential demand over the last five years indicates an annual level of 25-30 lots. Normal growth over the next five years of 150 lots can be satisfied by potential lots on existing land (infilling and subdivisions) which are now partially serviced. However any substantial increase in population would mean utilization of unserviced potential expansion areas or residential land available in adjacent communities could probably alleviate some of this demand. Between 900-1000 lots would be required about ½ of which could be supplied by the region in the short term.

22. Schools:

There are four (4) schools in Marystown, (3) three include the R.C. School Board. There is little excess capacity and students are bussed from Marystown to Burin. Given present student/teacher ratios approximately 100 students could be accommodated.

23. Vocational Schools:

School available in Burin which offers training in various skills. A strong emphasis to machinery and pipe-filling and heavy equipment repair is evident.

24. Access to Medical Facilities:

There are three cottage hospitals located in the region, St. Lawrence, Grand Bank and Burin plus two medical clinics in Marystown. There are plans for a large regional hospital to be located at Salt Pond, Burin. Work on this project may have to be acclerated.

25. Highway Access:

Both Marystown and the region are well served by first class paved roads. Road access exists to Spanish Room but would require some upgrading to accommodate tractor trailer traffic.

26. Rail Access: - none available.

27. Airport Access:

Marystown is almost equally distant from St. John's (220 miles) and Gander (205) airports. The closest air facility to Marystown is in Winterland approximately 10 miles west. The airstrip is paved 3000 ft. long x 75 ft. wide.

Environmental

28. Natural Environment:

Assessment is based on likely impact development will have on area in relation to present resource based activities.

Agriculture

A very minor industry, with only 30-40 people employed in the whole region. There is a possibility of some expansion, particular sheep farming so this could increase agricultural employment.

Forestry

Almost non-existent and the lack of good timber in the region makes it highly unlikely that woods operations will become significant. The Mortier Bay area has twenty-seven (27) sawmills with a total production of 283,000 from which is all sold to local market and has an employment of 10 manyears.

Fisheries

Since the early '70's the Burin Peninsula has taken between one-fifth and one-quarter of the total fish landing in this Province, making it Newfoundland's prime fishing region. In 1980 there were 746 boats operated and 1,633 fishermen. The fishing effort however because of strikes amounted to only 488 manyears. Total landings were 93 million lbs. at a landed value of twenty million ($20 m). There are five fish processing operations with a combined manyear effort of 2004; all but one are year round operations.

Mining

The Alcan Fluorspar mine in St. Lawrence which shut down in 1978, for economic reasons had a labour force of approximately 400 workers. It is unknown whether or not that mine will be reactivated. Only other mineral deposit is silica near Fortune which at present is not a viable operation.

Manufacturing

Almost 30% of the region labour force is in manufacturing, mostly fish processing and the Marystown Shipyard. Approximately 650 are employed at the Shipyard and over 2000 in fish processing.

The Burin Peninsula is a region of relatively high employment. Most occupations are will represented throughout the regional labour force. The labour force is fairly highly skilled in marine oriented occupations which could be adversely affected by the establishment of petroleum related activities in the area. How much "pull" on the fishing sector or the manufacturing section will be exerted is unknown but could be significant.

29. Acoustic Change:

The small community of Spanish Room will be adversely affected by noise level increase and a buffer zone will be required to reduce impact.

30. Visual Aesthetics:

Change from a visual perspective will be significant. The site has no development at present.

Social and Economic

31. Suitability of Site to Absorb Scale of Development:

In terms of infrastructure availability and labour force availability the area would have some problems in integrating a steel platform facility and a supply/service base. The constraints associated with the establishment of these facilities is outlined at the end.

32. Population Change:

For purposes of assessment it has been assumed that both operations will result in the creation of 1400 jobs directly and indirectly. Further assuming that 70% are in families would result in a population change of 4000 people. Given the present population of the Marystown area of approximately 6000 there would result in a 66% increase in population.

33. Labour Force Characteristics:

In 1978 the Mortier Bay area had 8,367 taxpayers and an average income of $11,437. Unemployed as a % of taxpayers was 44% which is not indicative of normal percentage as the Alcan closure has altered this figure. In January, 1981, there were 3654 persons receiving unemployment insurance, 23.1% (844) in construction; 3.1% (113) in machinery and fabrication and 49.7% in processing and fishing. The high % in processing is a result of 1980 fisheries strike. What these figures do indicate is that available labour supply is moderate in relation to construction activity and low in relation to the skill trade requirements for steel fabrication. This could result in either an extensive pull on existing industries, ie., fisheries and shipyard or a sizeable in-migration of qualified workers which would significantly alter the labour force structure of the region.

34. Community Services Availability:

The range of services in the Marystown area exceeds that of surrounding communities and is moderate in relation to the larger urban centres.

35. Displacement of Existing or Proposed Activities:

Although actual impact on existing activities cannot be accurately assessed at this stage it can be anticipated that petroleum related activities will be in competition for the same labour pool with marine oriented activities presently ongoing in the region. The degree of impact and the effect on the present economic structure however cannot be determined.

Pre-Conditions for Site Suitability

36. Constraints:

- the water and sewer system of the Town of Marystown will have to be extended and improved.
- a water system will have to be constructed to the site.

- landfill area for solid waste disposal will be required.
- road to site will have to be upagraded.
- from the point of view of noise and visual pollution, the community of Spanish Room might be adversely affected.
- both the fishing industry and the shipyard will be in competition with the offshore industry respecting skill trade availability.
- extension to existing school system will be required.
- increased focus on oil industry related courses will be required for the Vocational training school.
- strong direct government involvement will be needed to prevent unco-ordinated response to development and waste of services and land.

On Site Development Costs

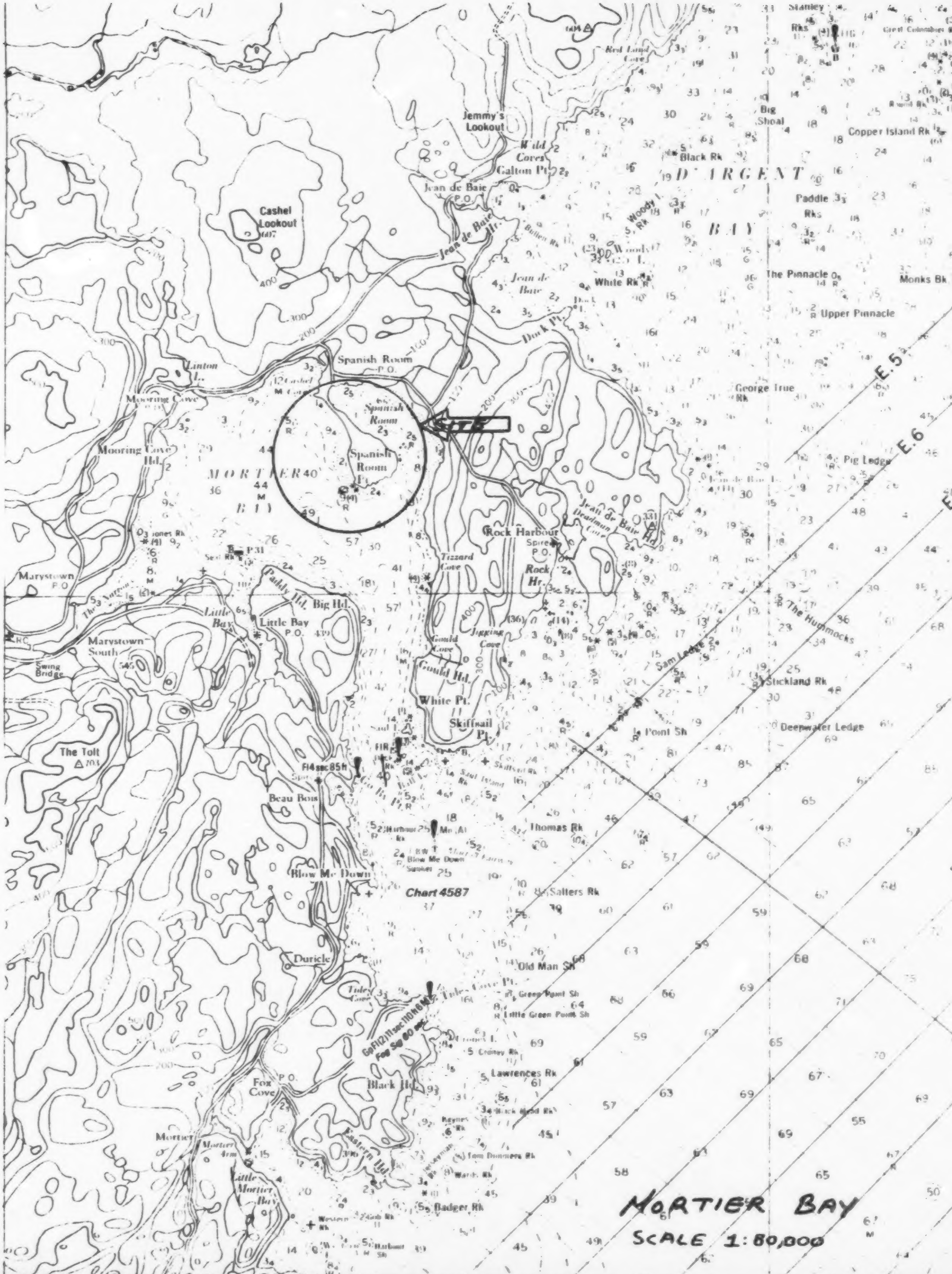
a) Supply Service Base

Wharf	$ 9,800,000
Road to Site	400,000
Water Supply to Site	2,000,000
Contingencies	600,000
Total	$12,800,000

b) Steel Platform Construction

Wharf	$ 4,500,000
Road to Site	400,000
Water Supply to Site	1,750,000
Contingencies	350,000
Total	$ 7,000,000

The cost of local, social, internal and industrial facilities will be extra.


Jemmy's Lookout
Wild Cove
Galton Pt.
Jean de Baie P.O.
Jean de Baie Hr.
Cashel Lookout
Black Rk
D'ARGENT BAY
Big Shoal
Copper Island Rk
Paddle Rks
Woody I.
White Rk
The Pinnacle
Monks Bk
Upper Pinnacle
Dock Pt.
Spanish Room P.O.
Linton L.
Mooring Cove
Mooring Cove Hd.
Spanish Room
Spanish Room Pt.
SITE
George True Rk
Pig Ledge
E.5
E.6
MORTIER BAY
Jean de Baie Hd.
Deadman Cove
Rock Harbour
Rock Hr.
Tizzard Cove
Jones Rk
Marystown P.O.
The Narrows
Little Bay
Little Bay P.O.
Paddy Hd.
Big Hd.
Marystown South
Swing Bridge
Gould Cove
Jigging Cove
Gould Hd.
White Pt.
Skiffsail Pt.
The Hummocks
Sam Ledge
Stickland Rk
Point Sh
Deepwater Ledge
The Tolt
Fl4sec85ft
Beau Bois
Saul Island
Thomas Rk
Blow Me Down
Salters Rk
Chart 4587
Old Man Sh
Duricle
Tides Cove
Green Point Sh
Little Green Point Sh
Cromey Rk
Lawrences Rk
Fox Cove P.O.
Black Hd.
Black Head Rk
Mortier
Mortier Arm
Little Mortier Bay
Eastern Hd.
Tom Dunmores Rk
Badger Rk
Western Rk
Harbour Sh

MORTIER BAY
SCALE 1:80,000

PRELIMINARY EVALUATION
OCTAGON POND DEVELOPMENT AREA
AS OIL - RELATED INDUSTRIAL PARK

OCTAGON POND DEVELOPMENT AREA

Potential Site for offshore oil-related industrial activity.

1. Site Description*

The Octagon Pond Development area contains over 450 hectares of land. It is situated km west of St. John's. The Newfoundland government owns the central portion of the site (220 ha - 136 ha developable). The Proctor and Redfern report suggests development of this property first, with provision for later expansion west toward Three Island Pond and east toward the proposed Outer Ring Road and St. Anne's Industrial Parl. McNamara & Wimpey (U.K.) propose storage, pipe coating and sub assembly fabrication on land in McNamara ownership in the area (60 hectares outside the government-owned central part of the development area.) ·

Existing developments in the area include:

Government land -

Steel Mill & site	leased to: Norcast Glass Fibre Plastics NOLS A. Harvey and Co. Ltd.

Other Ownership -

McNamara Industries
Paradise Recreational Centre
(near McNamara site)
Residential properties along Topsail Road

---

* Most of the information on the development area is from Proctor and Redfern's Report on Octagon Pond Industrial Park: Update 1980.

A large area of the total is occupied by five ponds. (This area is not included in the 450 hectares of land proposed for development). There are several areas of over 10% slope.

Land to the east of the site, across the Trans Canada Highway and proposed Outer Ring Road route, is in industrial use (Donovan's Industrial Park, St. Anne's Industrial Park). To the north, across Topsail Road, are residential sites overlooking the development area. West, around Three Island Pond, are more residential uses.

The development area is located at the intersection of existi and proposed major regional arterial roads: the existing Harbour Arterial connection with St. John's harbour; existing Trans Canada Highway linking to north west St. John's; proposed Conception Bay South bypass; proposed Outer Ring Roa to northeast St. John's and the airport. Thus the connection to the City of St. John's and to other municipalities in the John's Urban region are good. The proposed Conception Bay South bypass would link the site more closely to the proposed development areas at Long Pond - Manuels, and Seal Cove.

The Urban region population in 1976 is shown in the table bel

POPULATION, ST. JOHN'S URBAN REGION
1976 CENSUS

Regional Centre	
St. John's	86,400
Mount Pearl	10,200
Inner suburbs	13,600
Total	110,200
"Fringe Area"	41,500
Total	151,350

2. Local Government & Planning Status

The northern half of the site is within the municipal and planning area boundaries of Paradise, and southern half within the jurisdiction of the St. John's Metropolitan Area Board. Both Town Council and Board exercise development control over their respective parts of the development area under interim development control regulations. The development area is designated for Rural and Restricted uses in the St. John's Urban Region Regional Plan and the Metropolitan Area's municipal plan. A portion of the development area comprises the Bremigens Pond Protected Watershed.

The development area is proposed as a supplement to other industrial parks in the St. John's region in the event of oil-related demand. The question then arises as to whether one or two municipal governments should control development and tax revenues from such a regional asset. The development of a major industrial park will require planning and design, and the province has already undertaken work along these lines (Proctor & Redfern).

3. Physical Infrastructure

A 400 mm water main has been installed along the Conception Bay Bypass route. It leads from a storage reservoir (elev. 210 metres) nearby. Most of the development area is at a lower elevation and can be serviced by this main. Another mai

(300 mm) will be built along Topsail Road. The Proctor and Redfern report suggests these mains should be interconnected to improve distribution, and that this interconnection should be located on the development area, where it could serve an additional distribution function. The net cost of this interconnection (350 mm main) is estimated at $232,000 for external portions (1980).

The Proctor and Redfern report (1980) states that "full size services and off-site disposal must be provided" for sewerage. Eventually such a collection and disposal system would be divided between two systems, one system servicing the northern portion of Paradise and draining toward Topsail, and the other system serving the southern portion of Paradise and draining to the Waterford Valley drainage system. Plans are underway to install sewerage to serve the southern portion of Paradise; services for the northern portion of Paradise, based on domestic requirements, probably would be installed around 1984 or 1985. Thus in order to develop both northern and southern portions of the development area site before 1984, some interim method of servicing the northern portion, for disposal to the south through the Paradise trunk sewer, has been recommended in the Proctor and Redfern report. Such an interim solution requires a temporary pumping station and forcemain; the pumping station would be removed upon installation of the "northern" trunk sewer for Paradise.

Disposal costs associated with the site, but not the northern trunk sewer (temporary pumping station and forcemain; connection to Topsail trunk sewer) are estimated to amount to $325,000 (Proctor and Redfern, 1980). Cost of the Topsail (northern) trunk main (4500m, 350/400mm) are estimated at $1,525,000. A sewage treatment plant is costed at $500,000. This plant may not be sufficient to handle industrial wastes from the site, so that the estimate should be revised accordin when the nature of wastewater discharges are better understoo

A storm drainage system has been proposed for development of the site. The design of this system is not available.

Road access to the site from other regional points has been outlined above. Specific access points have been proposed; one from Topsail Road and one from the Conception Bay bypass (grade separation). As well, an underpass crossing to Donova Industrial Park, under the proposed Outer Ring Road, has been suggested by the Proctor and Redfern report. Present access to the site is poor, limited to an intersection of the Topsai Road and Old Steel Mill Road.

The site is on a rail link with the St. John's harbour, which could be developed as a means to move heavy materials to and from the Harbour quickly, and to Conception Bay South.

As mentioned above, the development area is 15 km. from St. John's harbour, with existing road (Harbour Arterial) and rail links.

4. Land Availability

The urban region has a large supply of land, both privately or publicly owned, which is scheduled for residential development. A partial inventory of these lands was prepared by the Newfoundland and Labrador Housing Corporation in March, 1980. The Table below, from the NLHC inventory, estimates the number of dwelling units, mostly single family, for which developed sites are available, for which land has been acquired (public agencies), or for which various approvals are outstanding. This compares with around 50,000 dwelling units in the entire urban region in 1976.

The Proctor and Redfern report includes an inventory of industrial land developed and available for future development in existing regional industrial parks and in the Octagon Pond development area. This inventory finds 66 hectares and 532 hectares available for development in 1980 and in future respectively. The report states that this area is sufficient for 6 years demand, at 10 hectares/year, the rate of development of regional industrial land over the past 10 years.

APPENDIX IX

SUMMARY OF CURRENT INVENTORY AND

PROPOSED AND POTENTIAL DEVELOPMENTS - ST. JOHN'S URBAN REGION

	Units[1]	
Development To Date:		
Mount Pearl New Town (NLHC/CMHC)	635	(387 S.F.)
Cowan Heights (SJHC)	—	
St. John's Metro Board	316	
Miscellaneous-Within City Limits	42	(S.F.)
TOTAL	993 units	
Proposed Development:		
Mount Pearl New Town (NLHC/CMHC)	382	(281 S.F.)
Cowan Heights (SJHC)	220	(S.F.)
St. John's Metro Board	801	
Miscellaneous-Within City Limits	73	(S.F.)
TOTAL	1,476 units	
Potential Development:		
Mount Pearl New Town (NLHC/CMHC)	5,778	(3991 S.F.)
Cowan Heights (SJHC)	1,950	
St. John's Metro Board	4,637	
Miscellaneous-Within City Limits	—	
TOTAL	12,365	
GRAND TOTAL	14,834	

SOURCE: As indicated Appendices V through VIII inclusive.

FOOTNOTE:

1. The columnar totals refers to mixed development since the S.F. breakdown was unspecified in some cases. Marginal notation identifies S.F. where available.

TABLE 1

EXISTING INDUSTRIAL PARK LAND

Preliminary Inventory

Name	Gross Area (ha)	Area Developed (ha)		Area to be Developed	
		1970	1980	1980	Future
Donovans	195	-	89	40	66
St. Anne's	21	-	21	-	-
Kenmount Road & O'Leary Avenue	156	80	130	26	-
Logy Bay Road	50	-	32	-	18
Airport Area	104	16	22	-	82
Octagon Pond					
- Present Site	220	-	-	-	136
- Possible Extensions	230	-	-	-	230
TOTAL	976	96	194	66	532

The average rate of development of industrial land over the past ten years has been ten ha/year. At this rate, the area planned for development in 1980 would ensure a six year supply for demands of a similar type to previous years.

5. Housing

Housing starts in the St. John's Census Metropolitan Area totalled 851 in 1979. The apartment vacancy rate for St. John's was 2.5% in June, 1980. This vacancy information does not include rowhouses and basement apartments, which comprise a significant proportion of the region's rental st
The NLHC inventory report was pessimistic about the supply
rental housing in the short run, noting the termination of federal programs (A.R.P. subsidies, M.U.R.B. tax benefits) and the St. John's rental value tax system as contributing factors. Forthcoming changes in the City property tax syste
and changes in federal tax policies (temporarily reinstatin
R.B.) could change the situation rapidly in view of the larg
supply of vacant residential land in the region.

6. Site Assessment

With the construction of proper road access and sanitary and storm sewerage collection and disposal, this development area is well suited for heavy industrial use.

Community Impacts

The development of another industrial site in the region will not have a large impact on such an urban area. There may be more localized impacts, however. Especially during later phases of development, the residents in the area along Topsail Road will have to be protected from the impacts of industrial activities on the site. Storm drainage could damage the quality of water in the ponds on site, and elsewhere, including the protected Bremigan's Pond Watershed.

Planning and Development Control

Neither Paradise nor the Metropolitan Area Board have land use zoning and subdivision controls in operation, and would have to rely on interim regulations to affect the design and operation of this industrial park. However, the Metro Board has previous experience with its Kenmount Road and Donovan's Industrial Areas. Like those developments, government ownership of part of the area makes it likely that layout and servicing will be carried out with professional advice. An amendment to the St. John's Urban Region Regional Plan will be required before development of the site gets underway.

Areas for Further Investigation

1. Clarification of construction timing of proposed arterials, especially the Conception Bay bypass, a major access point to the development.
2. Clarification of design and timing of proposed sewer and water mains.
3. Clarification of financial responsibility for improved wastewater treatment which site development may require.
4. Clarification of taxation and development control jurisdiction over the site as a regional asset.

Pre-Requisites For Site Development

Constraints

- some land within the Octagon Pond area is thought to be under private ownership, consequently compensation will have to be provided
- road access to St. John's Harbour, overflow area and Torbay Airport
- storm sewer system

Facilities Required

- development at Octagon Pond	$ 10,000,000
- distribution main for Paradise	1,500,000
- sewer main from Paradise	400,000
- Conception Bay South Bypass to Manuels	11,500,000
- road access to St. John's harbour and Torbay Airport	4,700,000
TOTAL	$ 28,100,000

PRELIMINARY EVALUATION
PORT UNION - CATALINA
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

tion: PORT UNION - CATALINA

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	∠150 A	33' deep	
- waveheight (3 ft.)	∠3'	suitable	
- cargo wharf 33' draft (500 ft.)	none	needs development	
- supply wharf 20' (900 ft.)	240'@ 20'	needs development	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	36'	adequate	
- channel width (800 ft.)	200'	540' @ 25'depth;200'@33'depth	
- approach depth (33 ft.)	250'@ 33'		
- turning basin (1000 ft.)	400'	limited manouverability	
FORESHORE AREA (20 A)	<20A	to be developed	
INDUSTRIAL AREA (200 A)		requires development	
ICE FREE (5% interference)		year round navigation	
PROXIMITY TO DEVELOPMENT	250		9
TRANSPORT NETWORK			
- highway		needs work bridge Shoal Hr.	5
- rail		rail service 1x per week	2
- air	St. John's	small local airstrip	0
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools		low capacity	0
- vocational schools		Bonavista & Clarenveill	5
- medical facilities		Cottage hospital	5
- housing (200 lots)	30 lots	servicing easy + Bonavista	3
- power supply	easy	no probel anticipated	10
- sewage disposal		needed for site	0
- solid waste disposal		incinerator	5
WATER SUPPLY	limited	50 households waiting for service	0
QUALIFIED LABOUR			
- construction (200)		Total labour force 2580	10
- fabrication (100)		most fishing, fish plant, boat building	5
LAND USE COMPATIBILITY			
- fishing		800 fishermen offshore plant	2
- forestry		some potential	4
- agriculture			10
- salmon rivers		no conflict	10
- wildlife		no conflict	10
CAPITAL COST			

PORT UNION

General Description

Port Union is located at the entrance to Trinity Bay and occupies the southern lobe of Catalina Harbour. It is roughly 100 km by road from Clarenville and 300 km to Gander.

Land chosen for further industrial development in the town straddles the boundary between Port Union and Catalina. The area of Port Union near the former railway station also offers good potential for development. The actual site chosen for the development occupies the southside of Catalina Harbour. The general topography in the area is densely wooded and hilly rising steeply from the seashore to an elevation of 50 ft.

Port Union had a population of 678 in 1976 and lies within an area having a total population of approximately 10,000. The largest town in the area is Catalina with a population of roughly 1200.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	-
2.	Protected Area	-
3.	Channel Depths	36 ft.
	Harbour Depth	33 ft.
4.	Channel Widths (25 ft.)	540 ft.
	(33 ft.)	200 ft.
	Approach Entrance (33 ft.)	250 ft.

5. Turning Basin 400 ft.

6. Existing Wharfage and Docks:

There are four docking facilities available at Port Union. The largest government owned wharf is 243 ft. x 30 ft. with a 15 ft. to 20 ft. draft.

7. Ice Restricted Access:

Port Union is accessible year round by sea. Offshore trawlers use the port of Catalina on the north shore of Catalina Harbour for twelve months of the year. Land fast ice is a common occurrence but pack ice rarely frequents the area.

8. Wave Restricted Access:

The maximum wave height for Catalina Harbour is recorded at 3 ft.

9. Wind Direction and Speed:

At Bonavista the maximum observed hourly wind speed is 70 miles per hour with a maximum gust speed of 102 miles per hour. No data is available for the Port Union site.

10. Fog:

Fog is most frequent in Newfoundland on the Avalon and Busin Peninsulas and occurs in moderate amounts in the Trinity Bay area during May, June and July.

11. Currents:

There is no data presently available on current conditions in the local area.

12. Tidal Variation:

The tidal amplitude at the site is approximately 4.1 ft.

13. Seabed Conditions:

Seabed conditions are classed as probably mud and gravel overlying bedrock.

14. Proximity to Drilling/Production Activity: - 250 miles.

15. Land Availability Foreshore:

Land at the site is classed as Crown land. It rises steeply from shore to an elevation of 50 ft. and is covered in coniferous forest.

16. Industrial Land Availability:

Land straddling the boundary between the towns of Catalina and Port Union has been recommended as a major site for future industrial development. This area and the proposed site need further investigation to determine current use and availability.

17. Topography:

The site area is characterized by siltstone, conglomerate, slate, acid to intermediate volcanic rocks. Most of the area is presently covered with fir trees.

Physical and Social Infrastructure

18. Water Supply:

A flouride treated water system brings water from nearby ponds to the town of Port Union. This system presently services 150 households with another 50 households yet to be serviced.

19. Power Supply:

The Provincial hydro electric grid serves the area with adequate electric power available for all forseeable industrial and residential development.

20. Sewage Disposal:

Port Union has a public sewage disposal system serving 115 households. Some 35 extra households are proposed for this system but presently rely on septic tank facilities. Sewage from the town's system is discharged into the harbour at two outfalls.

21. Solid Waste Disposal:

A landfill dump and an incinerator serves the town.

22. Housing:

In the immediate area of the site at Port Union there is land available for residential development. This is mainly in the east side of the town, along Water Street where a 30 lot subdivision could be developed capable of servicing with water and sewer. At least two other sites for future residential development have been investigated. The Newfoundland and Labrador Housing Corporation subdivision in Bonavista, approximately 16 km from Port Union, has serviced lots available for purchase.

23. Schools:

Port Union has 1 elementary school with an enrollment of 230 pupiles and 10 teachers on staff. Catalina, the bordering town has 3 schools including the regional high school.

24. Vocational Schools:

The closest vocational schools to the site are at Bonavista

16 km away and at Clarenville, 100 km away.

25. Access to Medical Facilities:

A provincial government cottage hospital with 50 beds and an ambulance service is located at Bonavista. The town of Catalina has a medical clinic with two resident doctors. There is also a druggist and a drug store at Catalina.

26. Highway Access:

A paved highway, route 24 connects Port Union with the Trans Canada Highway at Clarenville.

27. Rail Access:

Port Union is served by a rail terminal at Catalina and by a freight train once per week.

28. Airport Access:

The nearest D.O.T. Airport is Gander, 165 miles away.

There is a ¼ mile paved airstrip located 5 miles from Port Union.

Environmental Preview

29. Natural Environment:

The site is located in Moose Management Area No. 29. This area ranges from a low capability for moose to an high capability for caribou. The Canada Land Inventory classes the land here as capable of supporting greater than 9 caribou per square mile.

Seabirds and Waterfowl

There are a variety of seabirds and waterfowl in the

Trinity Bay area using the coastal region for feeding purposes. The site is not a seabird sanctuary for any type of seabird.

Fisheries

There is a fleet of 9 trawlers operating year round out of Catalina. An inshore fishery in the area is pursued by more than 1600 fishermen. Approximately 800 fishermen operated vessels up to 35 ft. during the past fishing season. While another 80 fishermen pursued the fishery from boats ranging from 36 to 69 ft. Total landings for the area are usually in excess of 90,000,000 lbs.

Agriculture

The site has no agricultural usage.

Forestry

The forest resources at the site are classified as marginal to sub-marginal.

Recreation

The proposed site has no recreational importance to the area.

30. Acoustic Change: - Minimal impact.

31. Visual Aesthetics: - Minimal impact.

Social and Economic Considerations

32. Community Services:

A wide range of community services are available in the town of Port Union and the surrounding area. These do not fully meet the needs of the existing population and would have to be upgraded to accommodate the proposed development.

33. Demographic Change:

The total population for the area during 1976 was 9081. The largest town is Catalina with more than 1200 residents. Port Union has a population of approximately 700. The area's population grew very slowly between 1971 and 1976 and this trend is not expected to change over the next ten years.

34. Labour Force Characteristics:

There is both a large male and female labour force in the region. In 1976 the total labour force was 2580 and 1235 of these were female. During the same year 175 were unemployed out of a total employable labour force of 1090.

Most people in the area work in fisheries related employment. The fish plant alone at Catalina has 500 employees and 30 people are employed in the local boatyard at Port Union. As mentioned earlier there are probably as many as 1600 inshore fishermen in the area today with another 200 fishermen employed on offshore trawlers. Other people in the labour force are employed in small scale sawmilling operations and the service industries.

Pre-Conditions for Site Suitability

35. Constraints:

- the actual site will have to be defined.
- there are limited facilities and services in the area to support storage and service functions associated

with the proposed development.

- road access will probably be necessary to the chosen site.
- water, sewer and electrical power capacities and locations have to be determined.

36. Facilities Required:

- Wharf	$ 9,800,000
- Dredging	1,300,000
- Water Supply	1,600,000
- Cabot Highway upgrading	10,500,000
Total	$23,200,000

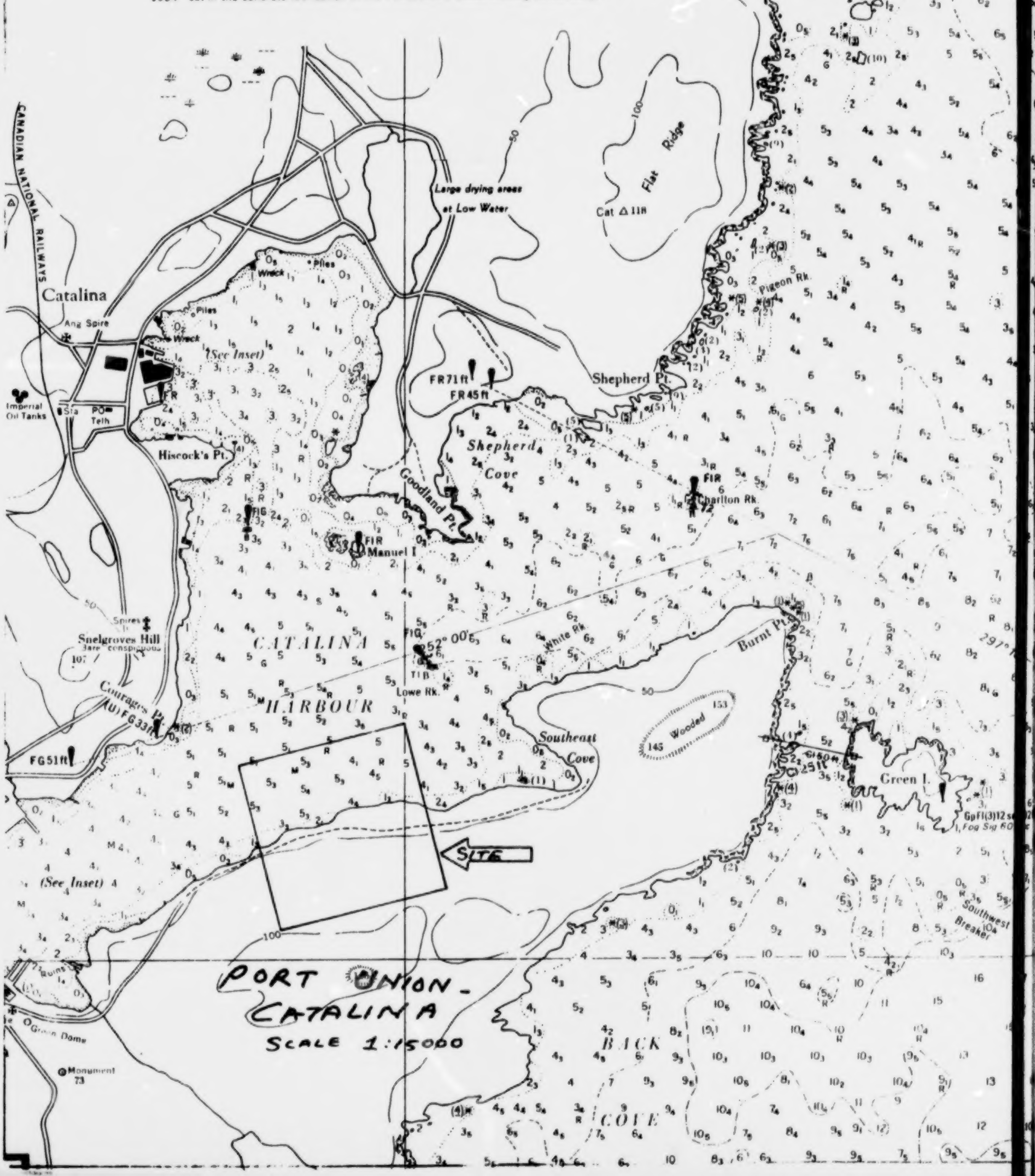
The costs of site preparation, internal servicing and a local road to the site will be additional.

TIDAL INFORMATION

PLACE	Height above Datum of Soundings				
	Large Tides		Average Tides		Mean Sea Level
	Higher H.W.	Lower L.W.	Higher H.W.	Lower L.W.	
	feet	feet	feet	feet	feet
Port Union	4·3	0·2	3·4	0·9	2·1

BENCH MARK

The datum of this chart at Port Union is 10·66 feet below a H.S. bronze tablet stamped "BM 1 1954" set in the concrete foundation of the Fisherman's Union Trading Co. building.



CANADIAN NATIONAL RAILWAYS
Catalina
Ang Spire
Imperial Oil Tanks
Sta
PO Telh
Wreck
Piles
(See Inset)
Hiscock's Pt.
Large drying areas at Low Water
Flat Ridge
Cat △ 118
Rowland Hd.
Pigeon Rk.
Shepherd Pt.
FR71ft
FR45ft
Shepherd Cove
Goodland Pt.
FlR
Charlton Rk.
FlG
FlR
Manuel I.
Spires
Snelgroves Hill
bare conspicuous
CATALINA
HARBOUR
White Rk.
Lowe Rk.
Burnt Pt.
Wooded
Southeast Cove
Courages Pt.
FG33ft
FG51ft
Green I.
Gp Fl (3) 12 sec
Fog Sig
Southwest Breaker
SITE
PORT UNION - CATALINA
SCALE 1:15000
BACK COVE
Ruins
Green Dome
Monument

PRELIMINARY EVALUATION
SEAL COVE
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: SEAL COVE

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	0	Conception Bay	
- waveheight (3 ft.)	>3'	requires breakwater or pier	
- cargo wharf 33' draft (500 ft.)	-	to be developed	
- supply wharf 20' (900 ft.)	-	to be developed	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)		Conception Bay - adequate	
- channel width (800 ft.)		" "	
- approach depth (33 ft.)		" "	
- turning basin (1000 ft.)	33,000'	width of Conception Bay	
FORESHORE AREA (20 A)	75A	totalled 75A to be levelled	
INDUSTRIAL AREA (200 A)		sufficient at Octagon Pond	
ICE FREE (5% interference)		usually short duration	
PROXIMITY TO DEVELOPMENT	250 mi.		9
TRANSPORT NETWORK			
- highway		new by-pass planned rd.poor	0
- rail		good link Octagon P.-S.Cove	10
- air	St.John's		10
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools (400 vac.)	no vac.		0
- vocational schools		local sch.,some ind. trades	10
- medical facilities	St.John's	many local physicians	10
- housing		lot of housing development	10
- power supply		transmission line at 2km	10
- sewage disposal	required		10
- solid waste disposal	"		10
WATER SUPPLY	no supply		0
QUALIFIED LABOUR			
- construction (200)			10
- fabrication (100)		1781 const., 369 fab.	10
LAND USE COMPATIBILITY			
- fishing		no conflict anticipated	6
- forestry		" " "	8
- agriculture		" " "	5
- salmon rivers		" " "	10
- wildlife		" " "	10
CAPITAL COST			

SEAL COVE, CONCEPTION BAY

General Description

Seal Cove is located on the south eastern shore of Conception Bay some 30 km drive from St. John's. Seal Cove is not incorporated although the town of Conception Bay South is actively campaigning for its incorporation with the growing municipality. The general topography in the community of Seal Cove could be classified as gently sloping to flat with contours ranging from 0 to 60 metres. The proposed site for development has been used as a gravel quarry in the past in addition to existing residential use on the southern boundary. While limited quarrying may be ongoing it is also used as an operations base by Butler's Sand and Stone Co. As a result of quarry operations by the above and Concrete Products the site is at least ten feet below the C.N. Railway track to the seaward and somewhat irregular in elevation from zero to 15 metres approximately.

Seal Cove is accessible from St. John's by the Conception Bay Highway which can be considered as inadequate and congested. Alternative road access is available from the T.C. H. via route 61 through Foxtrap and route 62 through Holyrood.

The chosen site is bounded by Lance Cove Pond on the east, Seal Cove Pond on the west, Conception Bay Highway on the south and Conception Bay itself on the north. The C.N. Railway runs parallel to Conception Bay on the northern boundary.

The site will have to be graded and the material for this operation should be availabe on site. The property contains 75 acres of land more or less.

The population of Conception Bay South number about 11,000 and includes the communities of Seal Cove, Long Pond, Manuels, Foxtrap, Kelligrews, Upper Gullies, Chamblerlains and Topsail. This site falls within the commutershed of greater St. John's with a population of over 140,000.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland) @ 33 ft. draft.	0 acres
2.	Protected Area (Entire Bay)	0 acres
3.	Channel Depth	0 ft. (existing)
	Harbour Depth	0 ft. (existing)
4.	Channel Width (@ 33 ft.)	0 ft.
	Entrance width (@ 33 ft.)	0 ft.
5.	Turning Basin Diameter @ 33 ft.	0 ft. 33,000 ft. (Conception Bay)

6. Existing Wharfage and Docks:

No suitable leased/private wharves or public wharves within the immediate vicinity.

7. Ice Restricted Access:

Pack ice may occur in Conception Bay between mid January to March and clears itself between mid March to April 20th. The duration of ice present is normally short. Based on statistics for the period 1960-1980 the mean annual duration of ice of 1/10 or greater concentration in the approaches to Conception Bay is 18 days. Most of the supply vessels now operating are ice-reinforced and would be able to operate 90% of the time with ice concentration of 1/10 or greater though trip time would be increased. In Conception Bay, dense drift ice can occur if there is a general trend for the pack ice to remain close to shore. Northeast winds would tend to move the pack ice on shore and these conditions would worsen with long duration onshore winds. The prevailing westerly winds tend to make the ice conditions more severe on the eastern side of Conception Bay. Under conditions of high ice concentration with strong onshore winds ice breaker assistance could be required.

8. Wave Restricted Access:

Wave height at the entrance to Spaniards Bay has been stated at 18 feet. The greatest fetch would lie in a direction of NNE from Seal Cove hence the largest waves would be experienced with these prevailing winds. Some protection from the elements will be afforded by Bell Island and Kelly's Island. The wave height at Seal Cove has been estimated at 10 feet. A breakwater will be required to protect the artificial harbour.

9. Wind Direction and Speed:

Westerly winds prevail along the east coast of the island with gale force winds (57.5 to 101 km/hr) occurring some 5 to 6% of the time. Due to the location of Seal Cove, winds from the NW to NE which occur some 14 to 32% of the time with an average maximum velocity of 18.3 m.p.h. would probably be of most concern.

10. Fog:

Fog occurs during May, June and July. Prevailing westerly winds which occur some 34 to 53% of the time during these months assist in providing better visibility in the onshore zone. It should be noted that fog is a common occurrence on the Avalon Peninsula.

11. Currents:

Geographical and tidal conditions in Conception Bay are not conducive to producing significant longshore currents. There are no large rivers near Seal Cove which could create even local current.

12. Tidal Variation:

The amplitude of large tides are in the order of 5.1 feet. Tides of this magnitude are not considered significant towards the operation and loading of cargo ships and offshore supply vessels,

13. Seabed Conditions:

Sea floors soils are of a possible gravel nature with a probable size range from silts to boulders.

14. Proximity to Drilling/Production Activity:

Seal Cove is in the order of 250 miles from the Hibernia discovery.

15. Foreshore Land Availability:

A large portion of the proposed development area is a rather extinct gravel pit and it shows very obvious signs of this operation. As such it contains level areas, sloping areas, steep cliffs and the occasional mound of unsuitable material. The site must be graded and increased in elevation with fill due to its low elevation with regard to the railway. All or part of the fill required may already be on site. Unless the C.N. Railway is relocated a public crossing would have to be provided.

16. Industrial Land Availability:

It would appear the foreshore area is in excess of that required. Consequently, part thereof may be used as an industrial park to complement the module fabrication site at Octagon Pond.

17. Topography (surficial geology):

This area once contained large quantities of gravel and sand but it has been mostly mined out. While small quantities of material are left near the perimeter of the pit a larger portion may be suitable for general fill. Of the two part commercial operations in the area one company has moved elsewhere while the second supplements its operation from another source in Seal Cove.

Due to the general coarse grain nature of the soil the material should be relatively free draining. This area would appear to give a stable foundation providing acceptable design procedures were followed. A detailed survey of the area would determine the remaining quantities of aggregates available. Past use was for concrete aggregate and/or sand in addition to masonary sand. It would appear the coastline is slowly eroding and this bears further investigation.

Physical and Social Infrastructure

18. Water Supply:

Seal Cove residents are supplied with potable water through a system of private wells. A municipal supply of water for residential and industrial use does not exist at present. The Conception Bay South water system is under construction but Seal Cove will probably be the last community to be serviced.

19. Power Supply:

The electrical power supply in Conception Bay is controlled by Newfoundland Light and Power. A transmission line runs parallel to the coast about 2 km behind Seal Cove with a capacity of 66 KV and a distribution line to Seal Cove with a capacity of 12.5 KV. Telephone communications are available to local residents but this may require upgrading, which may require one to 1½ years.

20. Sewage Disposal:

As with the water system a municipal sewage system does not exist. Residents dispose of sewage by septic tanks and industries would be expected to do the same. Present planning does not include a sewer system for Seal Cove.

21. Solid Waste Diposal:

As far as can be determined a solid waste disposal site for Seal Cove is not in existence at this time. Local residents probably dispose of solid debris through incineration. A supply/service base would require a disposal site.

22. Housing:

The number of new families moving into the area or the number of new housing units required would depend upon the length, stability, size of the operation, commutershed available and the number of locals employed who already have acceptable housing. The town of Conception Bay South is growing rapidly and residential land is being made available. It is understood most lots are being made available on an unserviced basis while some lots may be serviced with water and sewer under phase I of the water and sewer plan.

23. Schools:

The existing elementary and high schools in Conception Bay South are either over-crowded or filled to capacity. Some sources indicate the growing community is placing a large demand on existing facilities. While some expansion is planned this is expected to keep pace with traditional growth only and any large influx of students would require additional facilities.

24. Vocational Schools:

Seal Cove does have a vocational school with limited industrial trades. The Bell Island D.V.S. is of a similar type. The St. John's area can offer vocational education through the College of Trades, Marine education through the College of Fisheries and Marine Engineering. St. John's also contains a modern university. The development at Seal Cove would have easy access to graduates from these institutions.

25. Access to Medical Facilities:

The Conception Bay South area does not have access to a local hospital facility although there are practicing physicians in the area who have established local clinics. It should be pointed out, however, that the area is well served by major medical facilities within St. John's. These facilities at St. John's have 335 physicians, 37 dentists, 1762 beds, 36 public health nurses with ambulance services and a number of specialized units or services.

26. Transport Systems:

Seal Cove is accessible to the T.C.H. via route 62 through Holyrood and the Foxtrap Access Road, i.e., route 61. The Conception Bay Highway is over congested and in poor order with low speeds due to congestion, poor alignment and the proximity of housing to this secondary road. The road link to the industrial park at Octagon Pond would be through this route until the proposed Conception Bay South By-Pass is constructed. Construction of this facility is expected to cost some $20,000,000 (approximately) but no schedule has been set. Property has been purchased and right-of-way cut for one-half of this road but funds are not available although it is of high priority.

Railway access is available at Seal Cove since the main line lies on the northern boundary. This would give some justification towards the use of rail mode of transport for heavy, bulk materials from Seal Cove to Octagon Pond or St. John's Harbour or even some mainland points. However, publicity indicates this is a slow, long and otherwise inefficient system, consequently it is not expected to play a major role in the development.

The nearest commercial airport would be that administered by the M.O.T. at Torbay. Torbay airport is approximately 25 miles from Seal Cove. Torbay Airport has regional and national status and international flights must land at Gander. Regularly scheduled flights, passengers and/or cargo, are provided by EPA and Air Canada. St. John's is serviced by regularly scheduled cargo ships from Montreal and/or Halifax in addition to being the eastern terminus for the railway.

Environmental Preview

29. Natural Environment:

The area proposed for development has been developed as a quarry site. Some green area exists on the southern and eastern boundaries which could be classified shrubs and grass. No salmon rivers, moose or caribou habitats exist within the proposed development area.

The specific site is not seen to contain wildlife since it is mostly bleak as a result of the quarry operation. The surrounding countryside can be classified as moderately capable of supporting moose and caribou. Specifically caribou calving or wintering grounds are greater than 30 miles from the site although no details were available upon the kill within the immediate area. The yearly moose kill for 1976 to 1979 ranges from 38 to 43 animals per season for the entire management area (35). Terrestrial wildlife with particularly large game will not be directly effected by development in the shore or near shore areas.

Seabirds and Waterfowl

Seabirds are the most vulnerable of the natural species which could be affected by oil development. While there are a variety of seabirds and waterfowl in Conception Bay all species use coastal regions for feeding purposes. Major damage would result in the event of an oil spill.

This area is not considered a productive waterfowl habitat nor is it a seabird sanctuary.

Fisheries

Within a 30 mile radius of Seal Cove nearly 94.5 million pounds of fish were landed for a value of nearly $10 million (1979). This was accomplished within a 262.5 manyear effort by some 1056 fishermen. More specifically Seal Cove river does not have any reported Salmon catch nor is there any available information on local fish catch if any.

Agriculture

Generally speaking this area of the Avalon has been rated low on the land priority for agriculture with pockets of high priority. An agriculture development area has been frozen about one mile from the proposed industrial site. At this time no conflict can be seen between the proposed development and agriculture development area.

Forestry

In 1980 there were some 36 sawmill operations within a 30 mile radius of Seal Cove. Total production amounted to just over one million board feet, or some 3% of the provincial total with an estimated employment of 34 manyears. The commutershed could be rated from moderate capability to negligible capability in the forest sector. The specific development area is of little interest with regard to forestry.

Recreation

Generally speaking the land surrounding Seal Cove has limited potential to moderate potential for dispersed recreation. With regard to the proposed development and existing quarry no conflict can be seen between recreation and a supply/service base.

From information obtained in this study impacts due to the construction and operation of a supply/service base at Seal Cove are likely to be minimal. The only significant impact would be the extinction of a quarry operation which may not be critical and the alteration of the marine environment and removal of the remaining limited vegetation.

30. Acoustic Change:

The proposed development is unlikely to create any major acoustic interference provided proper sound absorbing devices are utilized. Existing residents (about two dozen households) now situated along the southern and eastern boundaries would probably receive the greatest interference however they are now exposed and effective buffer zones would reduce the disturbances.

31. Visual Aesthetics:

Little impact is forseen on the negative side and if anything the overall aesthetics of the area could be improved somewhat. Selection of proper sound buffering materials may increase the aesthetic value.

Social and Economic Considerations

32. Community Services:

The proposed site lies within general commuting distance of Holyrood and St. John's where a very wide range of facilities are available. The stress on existing facilities and the desire to have additional facilities will to a large extent depend upon the degree of in-migration for the proposed development.

33. Demographic Change:

Given the population base of the Conception Bay South shore (approaching 20,000) and the population of St. John's it is anticipated the change in population would be small. Due to the mobility of the Newfoundland worker the effect will be spread over the entire region. The majority of people living in the immediate area work in the retail and service industry with many commuting to St. John's daily.

34. Labour Force Characteristics:

In 1978, the number of taxpayers within Seal Cove, Greeleytown and Georgetown numbered 375 with an average income of $10,635. The St. John's Metropolitan Area contained 50,380 taxpayers with an average income of $12,916.

Within the Seal Cove commutershed some 10,753 people were receiving U.I.C. benefits as of January, 1981. Of these some 7059 were male and 3694 were female. Some 26.7% of these or 2871 were construction workers while 6.1% were machinists and fabricators. The U.I.C. report for January 22, 1981, estimated the following unemployment: construction workers (1781) or 23.7%; machinery and fabrication (369) or 5.0%; transport equipment and material handling (677) or 9.0% with the remainder split amongst various occupations.

Pre-Conditions for Site Suitability

35. Constraints:

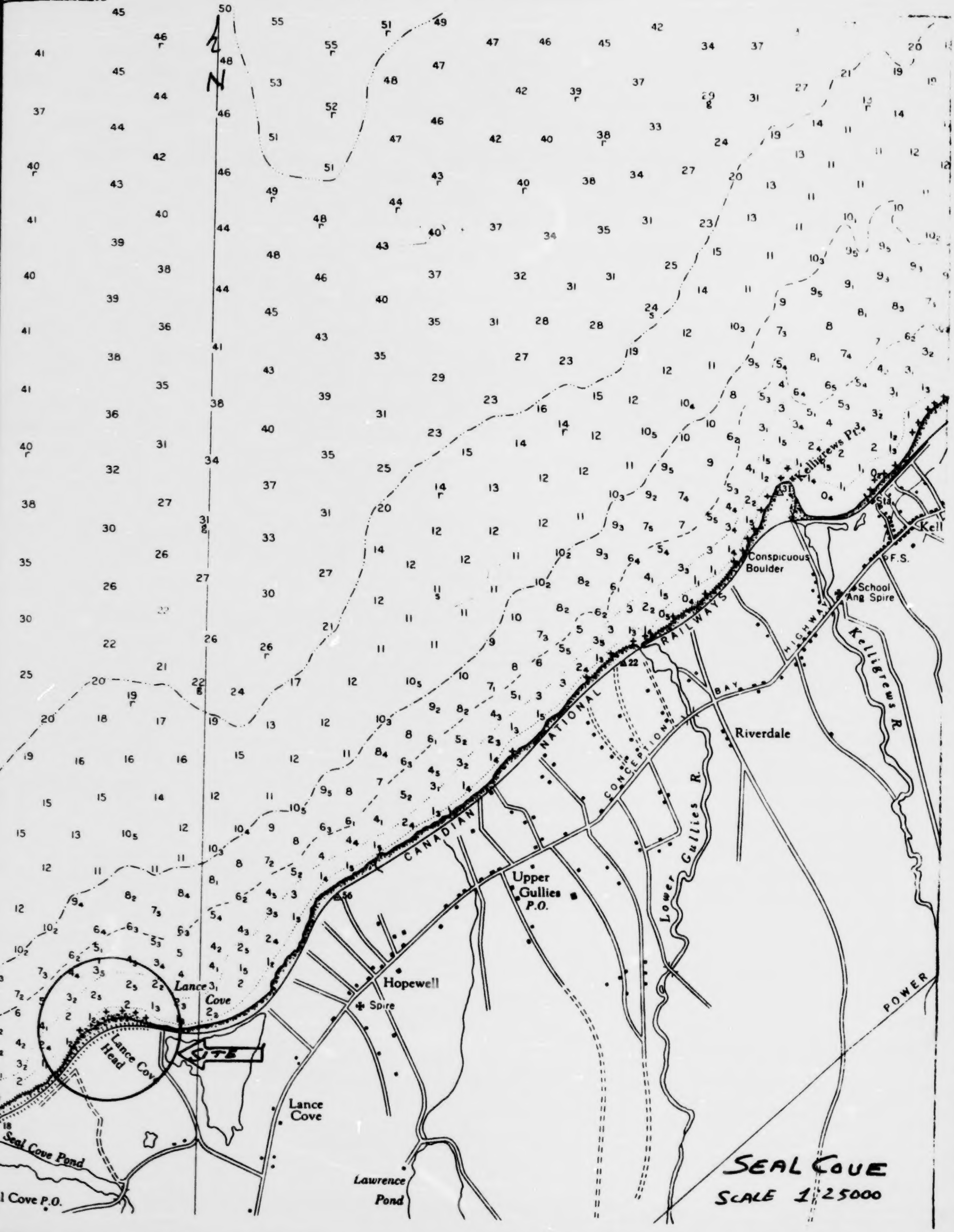
- construction of an access road to link Seal Cove, Octagon Pond, St. John's Harbour and Torbay Airport.
- investigate the availability of aggregates at the quarry site.
- consider the impact (aesthetics and acoustic) of the development upon residents at the boundaries.
- municipal upgrading package required to go hand in hand with the proposed development, especially for water and sewer services.
- effective zoning should be implemented, both Foxtrap

and Seal Cove should be brought within the jurisdiction of the town of Conception Bay South.

- regional survey of existing capacity of land services to pinpoint public facilities which would be put under strain by additional development, especially educational facilities.
- development should go hand in hand with the St. John's Harbour, Octagon Pond and Torbay Airport development with a co-ordinated effort to ensure smooth development.
- relocation of the C.N. Railway or installation of a public crossing with the approval of the Canadian Transportation Commission.
- electrical power supply and utilities must be made available to the site.
- solid waste disposal site must be found.

36. On Site Development Costs

- highway upgrading (Conception Bay South ByPass)	$20,000,000
- harbour facilities	6,000,000
- water supply	700,000
Total	$26,700,000


N
Kelligrews Pt.
Kell
F.S.
Conspicuous Boulder
School
Ang. Spire
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CANADIAN NATIONAL RAILWAYS
CONCEPTION BAY HIGHWAY
Riverdale
Lower Gullies R.
Upper Gullies P.O.
Hopewell
Spire
Lance Cove
Lance Cove Head
SITE
Lance Cove
Lawrence Pond
Seal Cove Pond
l Cove P.O.
POWER

SEAL COVE
SCALE 1:25000

PRELIMINARY EVALUATION
SHAMBLER'S COVE
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

Location: SHAMBLER'S COVE

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	150A	suitable - 33' deep	
- waveheight (3 ft.)	> 3'		
- cargo wharf 33' draft (500 ft.)	none	requires const.or infilling	
- supply wharf 20' (900 ft.)	none	" " "	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	180'		
- channel width (800 ft.)	2300'		
- approach depth (33 ft.)			
- turning basin (1000 ft.)	2300'		
3. FORESHORE AREA (20 A)	< 20A	not available at site	
4. INDUSTRIAL AREA (200 A)		requires development	
5. ICE FREE (5% interference)			
6. PROXIMITY TO DEVELOPMENT			
7. TRANSPORT NETWORK			
- highway		good condition	5
- rail		nearest at Gambo	0
- air		Gander nearest	5
B. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE			
- schools		2 in Valleyfield	0
- vocational schools		Gander nearest	0
- medical facilities		Gander nearest hospital	0
- housing		housing scarce	0
- power supply		available at some cost	5
- sewage disposal		required	0
- solid waste disposal		required	0
9. WATER SUPPLY		required	0
0. QUALIFIED LABOUR			
- construction (200)		total force 3350	10
- fabrication (100)		586 const., 49 fab.	5
1. LAND USE COMPATIBILITY			
- fishing		small fishery	8
- forestry		no mills	10
- agriculture		no potential	10
- salmon rivers			9
- wildlife			10
. CAPITAL COST			

SHAMBLERS COVE, BONAVISTA BAY

The site nominated for supply/service base operations lies in the Greenspond Island area. In order to reduce the capital costs of such development the best natural protection should be sought.

A road from the newly constructed route 320 to Shamblers Cove or some other nearby protected area would be required. Development will be by cut and fill construction in an effort to acquire suitable level land. An electrical power line crosses Ford Island from the Mainland to Greenspond Island.

The site is totally uninhabited at either Shamblers Cove or Broad Cove however some 600 residents are thought to live on the south and southwest corner of Greenspond Island. The nearest communities are Valleyfield and Centreville on the Mainland. Some 13,540 people live within the general region including Gambo.

Description of Harbour, Foreshore and Hinterland

1.	Protected Area (headland to headland @ 33 ft.)	0 acres
2.	Protected Area (Entire Bay @ 33 ft.)	150 acres
3.	Channel Depth Harbour Depth	180 ft. 40 ft.
4.	Channel Width (@ 33 ft.) Entrance Width (@ 33 ft.)	2300 ft. 2400 ft.
5.	Turning Basin (Diameter @ 33 ft.)	2300 ft.

6. Existing Wharfage:

Fishermen's wharves only. No wharves which are suitable and/or available for onshore oil related development exist in this area.

7. Ice Restricted Access:

Pack ice moving along with the Labrador current usually reaches Bonavista Bay around mid February and remains until nearly May. The entrance to Bonavista Bay will be blocked by ice of 1/10 or greater concentration about 55 days per year on average, and 125 days per year during severe conditions. Ice reinforced supply boats could operate 60 or 70% of these days.

Ice concentration onshore will be determined to a large extent by wind directions and speed while offshore ice persists.

8. Wave Restricted Access;

The largest fetch exists SSE of Greenspond Island and extends into the Atlantic. Winds from the SSE direction occur about 16% of the time with an average wind speed of 20.5 m.p.h.; gust up to 102 m.p.h. have been observed. Wave action is expected to be severe especially with proposed construction.

9. Currents: - Unknown.

10. Fog:

Eastern Newfoundland does receive extensive fog but it is thought the Bonavista Bay area has less exposure. The prevailing westerly winds which occur some 35% of the time tend to move the fog offshore.

11. Wind Direction and Speed:

Prevailing westerly winds occur some 35% of the time with a maximum average velocity of 25.1 m.p.h. A maximum observed hourly speed of 70 m.p.h. has been recorded with the maximum observed gust speed of 102 m.p.h.

12. Tidal Variation:

The amplitude for large tides has been estimated at 4.2 feet. Tides of this magnitude are not deemed restricting for supply/service boat operation or loading.

13. Seabed Conditions:

Probably a silt layer overlying bedrock.

14. Land Availability (Foreshore and Industrial):

Industrial and foreshore land will have to be carved from the topography using cut and fill techniques. Landfill will constitute some of the construction behind marine structures. Generally speaking the land is hilly, barren with limited gravel deposits.

Physical and Social Infrastructure

15. Water Supply:

Piped water does not exist on site. A new water supply system will have to be established. Any one of the several ponds in the area may be capable of providing a supply.

16. Sewage Disposal:

Sanitary and storm water sewage systems do not exist and will have to be constructed.

17. Housing:

No housing (accommodations) exist in Shamblers Cove. Valleyfield is a municipal area however accommodations are possibly limited to private homes and one hotel.

18. Power Supply:

Residential power supply to Greenspond exists. It is thought this would have to upgraded. Expense and lead time involved are not known.

19. Medical Facilities:

Nearest facility at Gander.

20. Schools:

Two schools exist in Valleyfield with a student population of 540. Additional capacity for some 25-30 students is possible and expansion is not planned.

21. Vocational Schools:

The district vocational school at Gander would be the nearest facility. Some commercial, industrial and service trades are taught.

22. Transportation Systems:

Shamblers Cove is connected to route 320 by a very low standard gravel road which requires reconstruction. Route 320 from the Shamblers Cove intersection to the Gambo intersection is newly constructed.

The nearest railline occurs at Gambo and it is unlikely this mode of transport will be utilized.

Gander has the nearest commercial airport administered by the Ministry of Transport. This international airport is located some 85 miles away.

Environmental Preview

23. Natural Environment:

The site contains turf of limited depth with grass overlying rock. No salmon rivers are located near the site. Several limited sources of gravel or sand-gravel deposits occur on the road to route 460.

Wildlife

The site has moderate and low capability to support caribou and moose respectively, no conflict is seen to exist.

Forestry

The land has severe limitations which preclude the growth of commercial forest consequently no conflict is seen to exist.

Agriculture

The land is hilly, barren, rocky,consequently no conflict is seen to exist with respect to farming.

Fisheries

No salmon rivers are located on site. Some 5,771,398 pounds of fish were caught during 1980 with a landed value of $1,108,502. A fish processing plant is located at Valleyfield. Since fishing is not known to occur in the tickle no conflict is seen to exist.

Recreation

Limited potential to low capability recreation land exists, consequently no conflict is forseen.

24. Acoustic Impact:

Some acoustic impact will be felt by the residents of Greenspond Island. At present the community is isolated and the proposed causeway will increase acoustic interference. Addition of a supply/service base in the area will add to the impact however this may be reduced by locating the base on the mainland.

25. Aesthetic Impact:

Some change in aesthetics will occur but conflict is not forseen.

Social and Economic Considerations

26. Due to the relatively lack of industry in this area the start up of a supply/service base would bring about some change. The remote island of Greenspond would be able to attribute change to the causeway and road facilities in addition to the onshore oil base.

Some 2501 taxpayers live in the general area with an average income of $10,715 per year. As of January 22, 1981, some 1263 people were receiving U.I.C. benefits or 310 females and 953 males. Some 6.0% or 75 people were clerical and managerial personnel, machinists and fabricators accounted for 3.9% or 48 people while construction at 46.4% accounted for

582 people receiving benefits.

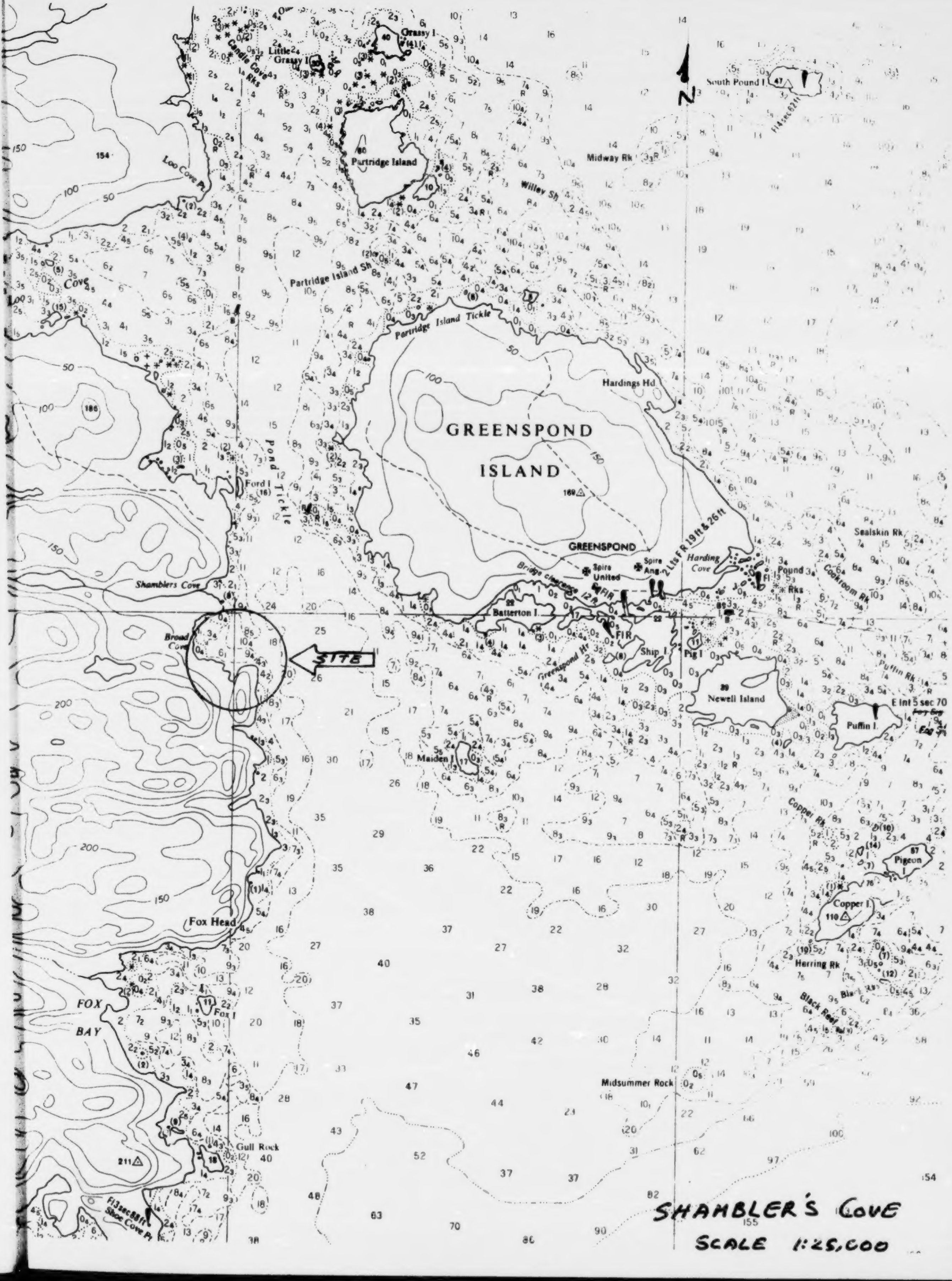
Pre-Conditions for Site Development

27. Constraints:

- extensive breakwater system may be required.
- water supply, waste disposal systems required.
- study required to pinpoint land and social services required.
- upgrading of local road required (to Shamblers Cove)

28. Onsite Development Costs (Part-time Operation)

Road	$ 3,476,000
Wharf	4,400,000
Water System	900,000
	$ 8,776,000



N
Grassy I
Little Grassy I
Candle Cove Rks
South Pound I
Fl 4sec 62ft
Partridge Island
Loo Cove Pt
Midway Rk
Willey Sh
Partridge Island Sh
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Partridge Island Tickle
Hardings Hd
GREENSPOND ISLAND
Pond Tickle
Ford I
GREENSPOND
Spire United
Spire Ang
2 Lts F R 19ft & 26ft
Harding Cove
Pound
Rks
Cookroom Rk
Sealskin Rk
Shamblers Cove
Broad Cove
Bridge clearance 12ft
Batterton I
F R
Ship I
Pig I
Greenspond Hr
SITE
Newell Island
Puffin I
E Int 5 sec 70
Puffin Rk
Maiden I
Copper Rk
Pigeon I
Copper I
Herring Rk
Black Reef
Fox Head
FOX BAY
Fox I
Midsummer Rock
Gull Rock
Fl 3sec 88ft
Shoe Cove Pt

SHAMBLER'S COVE

SCALE 1:25,000

PRELIMINARY EVALUATION
STEPHENVILLE
AS A LOCATION FOR

a) SUPPLY/SERVICE BASE
b) MODULE FABRICATION AND ASSEMBLY

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: STEPHENVILLE

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	25A	not suitable	
- waveheight (3 ft.)	<3'		
- cargo wharf 33' draft (500 ft.)		to be developed	
- supply wharf 20' (900 ft.)		to be developed	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	30'	less than minimum	
- channel width (800 ft.)			
- approach depth (33 ft.)	88'	88' for 6500'/length	
- turning basin (1000 ft.)	650'	less than minimum	
3. FORESHORE AREA (20 A)	61A	suitable	
4. INDUSTRIAL AREA (200 A)	680A	suitable	
5. ICE FREE (5% interference)			
6. PROXIMITY TO DEVELOPMENT	650 mi		1
7. TRANSPORT NETWORK			
- highway		industrial access rd.,1981	10
- rail		branch line available	10
- air		MOT airport	10
B. SOCIAL AND ENVIRONMENTAL(ranked)			
8. EXISTING INFRASTRUCTURE			
- schools		excess capacity for 560-760 students	10
- vocational schools		voc.school & community Col.	10
- medical facilities	Hospital	also at Corner Brook	7
- housing		available	10
- power supply		available	10
- sewage disposal		required	0
- solid waste disposal		sufficient	10
9. WATER SUPPLY			
0. QUALIFIED LABOUR			
- construction (200)	720	industrial oriented	10
- fabrication (100)	176		10
1. LAND USE COMPATIBILITY			
- fishing			9
- forestry		no potential	7
- agriculture		potential	5
- salmon rivers		no conflict	10
- wildlife		no conflict	10
. CAPITAL COST			

STEPHENVILLE

General Description

Stephenville is located on the west coast of Newfoundland some 100 miles drive from Port aux Basques and about 50 miles from Corner Brook. The general topography of the town of Stephenville is relatively flat with contours ranging from 0 to 125 feet. Immediately left of the town the Indian Head Range rises sharply to an elevation of 600 feet while the land to the immediate right could be classified as sloping until it meets the Long Range Mountains where it rises to 1235 feet. The terrain behind Stephenville could be classified as rolling.

The town itself is located on Bay St. George and the proposed development area lies within Port Harmon which is sheltered from the open sea by a sand bar and breakwater. The site is a parcel of land along the Port Harmon shoreline which extends back past the industrial access road now under construction. It comprises 300 hectares or 740 acres; a very small portion is covered by water (41 acres), some 45 acres are developed and 580 acres are vacant and covered by bog estimated up to 6 feet thick overlying gravel. The remaining 74 acres are thought to be of gravelly nature.

Stephenville has an estimated population of 11,410 people and some 15,125 more are located within the Bay St. George Region. The population of Corner Brook some 60 miles away has been estimated at 26,436 in 1976.

Stephenville is known as the hub of the Bay St. George area and this is mainly due to its industrial base and airport. A paper mill operation is scheduled to come on stream this fall, a fish meal processing plant is located in Stephenville with several other small industries. The harbour is administered by the Ministry of Transport and is classified as operational on a year-round basis. The deactivated U.S. Airforce Base has left a large facility behind, part of which is now used for the airport and other miscellaneous uses.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland @ 33 ft.)	25 acres
2.	Protected Area (Entire Bay @ 33 ft.)	25 acres
3.	Channel Depths	30 ft.
	Harbour Depths	33 ft.
4.	Channel Width (@ 33 ft.)	88 ft. for 6500 ft./length
	Entrance Width (@ 33 ft.)	0 ft. (dredging proposed)
5.	Turning Basin Diameter (@ 33 ft.)	650 ft.

6. Existing Wharfage and Docks:

No leased or private wharves which are suitable or available for development. No public wharves which are suitable for onshore oil related development.

7. Ice Restricted Access:

The harbour at Stephenville usually freezes over during the winter months however ice thickness is generally thought to be less than 30 cm thick. Continuous navigation tends to eliminate the freeze over.

Sea ice found on Newfoundland's west coast is mainly formed in the Gulf of St. Lawrence however some drift ice does find its way into gulf through the Strait of Belle Isle. Usually the gulf can be covered with ice but the lead around the coast remains open.

Pack ice is reported to reach Stephenville around mid February and last up to a maximum of six weeks before clearing itself. Drift ice does reach from 3 to 4 feet thick and occasional ice-breaking assistance is required. Strong continuous southwest winds tend to make the situation worse. Generally speaking ice-reinforced cargo ships can make headway and ore carriers are not known to require assistance. Older, lower powered ice-breakers have been stuck however the same conditions were handled by larger more powerful ships. Drift ice usually last 3 to 6 weeks, occasional ice-breaker assistance is required when strong SW winds persist.

8. Wave Restricted Access:

Port Harmon itself is well sheltered from the effect of storms consequently waves can be expected to have a small height within the pond. This also applies to the channel leading from the sand spit to the pond. The biggest navigational problem within the channel is due to winds and navigation is curtailed from December to March.

Outside in Bay St. George, wind generated waves can be severe with strong SW to NW winds similar to that experienced in the gulf. However, Bay St. George is estimated to offer significant protection from waves with northerly to southerly fetches (clockwise).

9. Wind Direction and Speed:

The prevailing winds are deemed westerly and these occur some 30% of the time with a maximum average velocity of 17.3 m.p.h. The next most significant winds would be those from the northeast which occur some 25% of the time, attaining a maximum average velocity of 14.5 m.p.h. The maximum observed hourly and gust speed has been recorded at 71 (NNW) and 85 m.p.h. respectively.

10. Fog:

Western Newfoundland does not receive the same degree of fog which is experienced in eastern Newfoundland. The number of days which affect commercial airline operation are possibly around two or three per year. Flight cancellations at Stephenville due to fog are much less than at Torbay Airport.

11. Currents:

Detailed information on harbour currents are not available for Stephenville, however, these which do exist are probably tidal. It would appear currents within the channel are not significant.

However, it should be pointed out a significant longshore drift occurs at the entrance to Stephenville harbour. The sand spit must be dredged on a regular basis and it is one of the few harbours in Newfoundland which requires maintenance dredging on a regular basis.

12. Tidal Variation:

Tides in Stephenville have an amplitude of 5.3 feet. Tides of such low magnitude are not deemed significant with regard to the operation of loading/unloading of supply/service vessels or cargo ships.

13. Seabed Conditions:

Seabed conditions can be classified as organic silt overlying fine to coarse sand and gravel. Piles would appear to constitute the best foundation system with regard to dock construction. Anchorage has been classified from non-existent to poor.

14. Proximity to Drilling/Production Activity:

Stephenville is located some 650 miles from Hibernia via the sea route around the south coast. For supply/service base operation Stephenville is at a significant disadvantage.

However, this distance is not significant in terms of a module fabrication site. Modules may be fabricated in Stephenville and shipped via road or sea to an assembly site on the island,

15. Foreshore Land Availabiity:

The foreshore land selected for this site borders the inside shore area of Port Harmon on the front and the road to the mill on the back. The foreshore averages some 1000 metres long by 250 metres wide, containing some 25 hectares or 61 acres. The land slopes gently towards the shore probably around 3 to 4%.

The land appears wet and boggy but this may be only on the surface. Irregardless drainage systems may be required. The foreshore area is located some 3.5 km to the new industrial access road via the existing road.

16. Industrial Land Availability:

It is possible the excess foreshore land described above may be used for industrial purposes. Much of the remaining land could also be developed for industrial purposes, or so it would appear. The land is vacant and some 680 acres is awaiting development. Covered and open storage capacity is available on the deactivated base. This area is largely paved and has some water and sewer services available.

17. Topography (surficial geology)

Geology of the area is recorded as paleozoic in the carboniferous grouping. Rocks in this category can be further subdivided into conglomerate, sandstone, siltstone, shale, limestone, gypsum, anhydrite and some coal.

Surficial geology reports this area contains sand and gravel of variable thickness except in the southeast corner which is a till veneer and rock. Personal observation indicates most of the area is wetland or bog. Two excavations on the eastern side of the new industrial access road indicates thick gravel layers with overlying bog up to two metres thick. On the west side of the road only a couple of feet of organic soil overlies gravel deposits.

Generally speaking wet bogland overlying thick gravel deposits occur. Gravel deposits to the north of the site are clean and well graded making them very useful for construction purposes. Two of the excavations mentioned earlier were used to provide gravel for road construction.

Large quantities of rock are available in the Indian Head range for fill if required. There are plutonic rocks classified as massive to foliated granitic rocks that include large areas of metamorphic rocks and mafic intrusions.

Physical and Social Infrastructure

18. Water Supply:

The site is served by the Stephenville municipal water supply system. The dock area is also serviced with an 8" line. The water supply Noel's Pond was supplying some 3400 m^3/day of industrial and potable water but surplus capacity is not known. An untreated water supply system serves the Abitibi Mill with 7800 m^3/hour. The town of Stephenville is interested in obtaining a new industrial water supply and discontinue use of Noel's Pond.

19. Power Supply:

The Stephenville industrial area is serviced by Newfoundland and Labrador Hydro who has a transmission line to the Abitibi Mill. Newfoundland Light and Power provides transmission and distribution of power to total users. Details of lead time required, expense and level of upgrading required if any are not available although it is possible extrusions to the existing system will be required.

20. Sewage Disposal:

The site is not served by a piped sewer system. The nearest municipal system is about 2½ km from the dock and surplus capacity is unknown. It may be more economical to install a separate sewage and treatment facility.

Storm sewage could easily be directed toward Stephenville Pond. A storm water holding pond may easily reduce high turbidity, if is a problem.

21. Solid Waste Disposal:

Four solid waste disposal sites are available within 20 km of the site. The Stephenville town council is planning upon opening a new sanitary landfill site and this may be best suited for onshore oil solid waste disposal.

22. Housing:

As of July, 1979, there were some 47 privately owned, detached residences vacant from St. Georges to Berry Head a distance of about 30 miles. It is thought some of these were in poor condition and may now be demolished. There are some 135 motel, hotel rooms and housekeeping units available. Several buildings remain vacant on the base but it is thought the one large building which could be economically renovated for apartment use will now be converted for the Bay St. George Community College.

Stephenville does contain fully serviced land available for residential development. Area 13 contains some 152 hectares, a portion of which is fully serviced excluding sidewalks and remains totally vacant. Area 11 now being developed contains some 146 mobile home lots. Area 20 contains some 7.3 hectares suitable for development. These three areas are presently contained in the Stephenville town plan. Semi-serviced or unserviced land is available outside town for housing development.

Recently Stephenville has been an area of boom and bust associated with relatively large projects which collapsed. As a result of this capital investment has not occurred in sufficient amounts with regard to temporary or transient accommodation. Hotel, motel accommodations are lacking and a reported 50 units could be utilized especially this past summer. Apartments are basically controlled by Newfoundland and Labrador housing with a reported waiting list numbering in the hundreds.

23. Schools:

The Bay St. George area has three school boards: Integrated, Roman Catholic and Pentecostal with 49, 211 and 15 classrooms respectively. These facilities provide kindergarten to grade eleven education. Expansions are not planned by either board since an additional capacity of 560 to 760 pupils is possible.

24. Vocational Schools:

The Bay St. George Community College is located in Stephenville. Present enrollment is down from 1000 to 700 students. The courses range from clerical types to industrial type occupations. The Bay St. George community college appears receptive to adding and/or changing courses to accommodate demand within the community. A district vocational school is located in Stephenville Crossing and within easy commuting distance of Stephenville. The Bay St. George College is now proposing to conduct a training program for the offshore oil industry.

25. Access to Medical Facilities:

The Sir Thomas Roddick Hospital is the only available hospital within the immediate area. There are 12 physicians and three dentists available. The hospital has between 89 to 100 beds with physiotherapy offered as a special service.

The regional hospital for western Newfoundland is located at Corner Brook some 60 miles away.

26. Transport Systems:

Stephenville is in the process of receiving an industrial access road which will connect it to Stephenville Crossing and the Trans Canada. The grading contract is complete on the first section with the second and final grading contract scheduled for completion in 1981. Paving of the entire access road is scheduled for completion in 1982. The distance form the T.C.H. to Stephenville will be 15 km.

White's road provided the original access to Stephenville from the T.C.H. at a distance about 30 miles. The new industrial access road is located some 25 km west of the intersection at White's Road. This new structure when complete will provide a more efficient link between Stephenville and the T.C.H. particularly with reference to truck traffic and the industrial park at Stephenville.

The Stephenville Industrial Park is served by a branch line of the C.N. Railway. However, this facility is not thought to be in use at this time since trucking operations prove more efficient.

The wharf at Port Harmon is thought to be of little use especially with the mill scheduled to begin operations soon. However, the facility may be used on an occasional basis.

Stephenville is served by a Ministry of Transport operated airport and is adjacent to the proposed site. The airport has alternate international status with Gander. It is given regularly scheduled passenger service by EPA and

Air Canada to regional and national airports. Two paved runways are available with lengths of 3048 m and 853 m.

Environmental Preview

29. Natural Environment:

The area proposed for development is presently vacant except for two roads, a rail and water line which cross the site. Four tanks for storage of petroleum products are also located within the boundaries.

No salmon rivers, wildlife or other animals are known to use the site which contains a significant amount of wetland. The outlying land surrounding Stephenville has low to high capability for moose (management area 6) and low to moderate capability for caribou. These areas should not be directly affected by this development.

Seabirds and Waterfowl

Seabirds are the most vulnerable of the natural species which could be affected by oil development, expecially an oil spill. Most coastal regions of Newfoundland serve as feeding areas for seabirds and the Bay St. George region is thought to be the same. Seabirds sanctuaries or habitats for endangered species are not present in the area. A productive waterfowl habitat lies in the northeast direction from Stephenville Crossing to George's Lake but development in this area should not directly interfere with this habitat.

Fisheries

Within a 30 mile radius of Stephenville (1980) there were some 380 boats employed in the fishery which landed 17,743,317 lbs. of fish with a value of $1,798,056. Some 544 fishermen were employed for a 87.7 manyear effort. Some 12,000,000 lbs. of fish were processed in the area in a nearly year-round effort from the inshore fishery. A fish plant and fish meal plant are located near the proposed site but there is no reason they should not coexist. Conflict due to the narrow channel leading to Stephenville harbour may be possible but trucking is thought to be the major system used in transporting fresh and processed fish.

Agriculture

The proposed industrial development does not have any conflict with agriculture in the area. The proposed agriculture development area lies on the Port au Port Peninsula.

The general area with respect to agriculture falls within Canada Land Inventory classes 3-7 with minor classes of 4-3 or high priority areas. Farming is ongoing within the Noel's Pond watershed but this should not be affected by the proposed development.

Forestry

The proposed industrial development area does not have any forest resources on site. Vegetation is limited to grasses and shrub brush on site and generally the same around town. Outlying land has severe limitations, low and moderate capability with respect to forestry potential. Surrounding timber land which do exist is mainly controlled by the Crown and Bowaters. In 1980 there were some 1,758,000 f.b.m. of lumber produced within the Stephenville region which created some 58 manyears of employment. No conflict is seen to exist between the two industries.

Recreation

The land proposed for industrial development does not have any existing recreational development. Land immediately adjacent to Stephenville is seen to have limited or low recreation potential. No conflict is seen to exist between recreational and industrial use.

Impact with regard to resources within the area is thought to be non-existent.

30. Acoustic Impact:

Acoustic impact is viewed as non-existent since the area is developed for industrial purposes and the transport route does not pass through a residential area within Stephenville.

31. Aesthetic Impact:

The aesthetic impact is thought to be non-existent since the site is located in an industrial zone. Possible conflict between airport operations and construction welding may be possible.

Social and Economic Considerations

32. Community Services:

As the proposed site lies within easy commuting distance of several communities access is available to a range of facilities. The strain on existing facilities will depend on the degree of in-migration with the proposed development. Regional community and government services are available in Corner Brook some 60 miles away,

33. Demographic Change:

The moderate population of Stephenville and the surrounding area of some 26,500 people are well adjusted towards absorbing large industries. Two large boom and bust situations have occurred within 25 years and the entire community has withstood these rather significant changes.

Corner Brook with a population of some 26,436 (1976) some 60 miles away can act as a stablizing factor for the area as well.

34. Labour Force Characteristics:

Unemployment statistics for Stephenville as of January, 1981, indicate some 2293 people were receiving benefits. Of these 1793 were male and 558 were female. Some 31.4% or 720 people were construction workers, 7.7% were machinists and fabricators while 30.7% were classified as process workers.

For 1978 there were 3,383 taxpayers in Stephenville with an average salary of $11,415. The Bay St. George area contained 5941 taxpayers with an average income of $10,534.

The study area contained 5320 people in the labour force during 1971. The same area contained 6920 people in the labour force during 1976 and this can possibly be attributed to the mill. Irregardless a very high mobility factor is apparent from these numbers. It would appear the community would have little trouble in attracting people for onshore oil related development that is after the unemployed had received jobs.

Pre-Conditions for Site Suitability

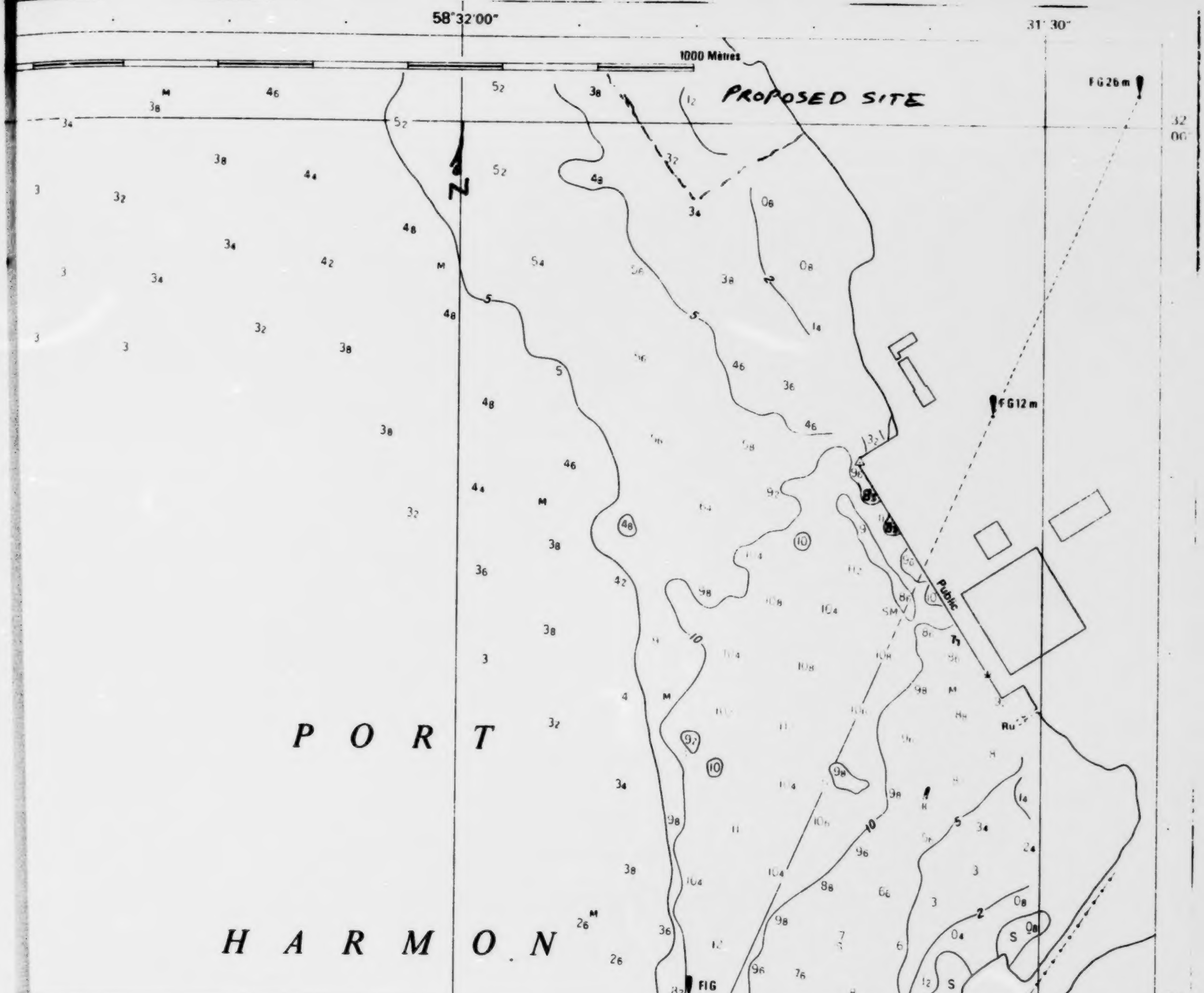
35. Constraints:

- regional survey of existing capacity of land and social services may be required to pinpoint public facilities which may be put under strain by rapid growth.
- some capital investment either through private and/or government funds should be made available to provide housing of a temporary nature such as but not limited to apartments, hotels, etc.
- due to the relatively long and narrow channel to Port Harmon some system of traffic management may be required to provide safe navigation if these facilities become congested.
- a municipal upgrading package may be required if a development should occur since surplus water supply capacity is not known.

- the local vocational schools (community college) should adapt itself towards training of workers for onshore jobs if required in addition to the offshore training program it proposes.
- investigate the effect of construction welding (bright light) on airport operations if any.
- a local road would be needed to connect the site with industrial access now under construction. This access can be accommodated through one or two of the proposed intersections in this area.

36. Estimated Site Development Costs

- Dredging		$ 1,040,000
- Wharf		4,200,000
- Site Preparation		300,000
- Water System		60,000
	Total	$ 5,600,000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PRELIMINARY EVALUATION

ST. ALBANS

AS A LOCATION FOR

a) CONCRETE PLATFORM CONSTRUCTION

b) STEEL PLATFORM CONSTRUCTION

TABLE 2
SUMMARY - STEEL PLATFORM CONSTRUCTION

Location: ST. ALBANS

A. Physical and Economic (critical)	Actual	Remarks	Ranking
1. SHELTERED PROTECTED HARBOUR			
- cargo wharf 600' at 33'	2200+A	Bay D'Espoir	
- dock 350' at 40'	50+'	sufficient	
- Buildup Pier 400' at 40'	50'	sufficient	
- Assembly Area	120'	sufficient	
- Tow out min. 40'	70'	sufficient	
Harbour depth 115' - 130'	300'	sufficient	
- Waveheight less than 3'	<3'	okay	
2. FORESHORE AREA 20 ha (50 acres)	50A	to be developed	
3. INDUSTRIAL AREA 60 ha (150 acres)	200A	to be developed	
4. ICE FREE 5% interfernce		no problem	
5. TRANSPORT NETWORK			
- highway	good	except for site access	10
- rail	none	unimporatant	0
- air	Gander	local small strip (150 miles)	5
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools (400 vac.)	200		5
- vocational schools	G.Falls		0
- medical facilities	clinic	Grand Falls	0
- housing	0	const. camp exists	0
- power supply	easy	can be provided	10
- sewage disposal		to be developed	0
- solid waste disposal		to be developed	0
2. WATER SUPPLY	inadequate	to be developed	0
3. QUALIFIED LABOUR			
- **construction** (350)	208	some construction;	6
- **fabrication** (700)	22	low fabricators	0
4. LAND USE COMPATIBILITY			
- fishing		few fishermen but offshore trawlers	7
- forestry		major local industry	0
- agriculture		little potential	10
- salmon rivers		little conflict	10
- wildlife		little conflict	10
C. CAPITAL COST			

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: ST. ALBANS

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			
- cargo wharf 500' at 33'	2200A	Bay D'Espoir	Suitable
- Dock 650'X650' at 33'			
channel width 800'	1000'@36'	on shore	"
- Buildup Site 800' at 260'	4800' @500'	105,000'from wharf	"
- Tow-out Base			
min depth 425', min width 200'	600'/4200'	sufficient	"
- Wave height, 3'	3'	okay	okay
- Dee Sink Site 800'wide @660'	5200' @660'	106,000'from wharf	suitabl
2. FORESHORE AREA (50 A)			
3. INDUSTRIAL AREA (150A)			
4. TRANSPORT NETWORK			
- highway			
- rail			
- air			
B. SOCIAL AND ENVIRONMENTAL		same as Steel Platfrom Const.	
1. EXISTING INFRASTRUCTURE			
- schools			
- vocational schools			
- medical facilities			
- housing			
- power supply			
- sewage disposal			
- solid waste disposal			
2. WATER SUPPLY			
3. QUALIFIED LABOUR			
- construction (700)	208		3
- fabrication (350)	22		1
4. LAND USE COMPATIBILITY			
- fishing			
- forestry			
- agriculture			
- salmon rivers			
- wildlife			
C. CAPITAL COSTS			

ST. ALBANS

General Description

St. Albans is located on the south coast of Newfoundland, approximately midway between St. John's and Port aux Basques. The town is located in Bay D'Espoir, a long fiord which runs northwards into the hinterland for approximately 48 km. The proposed site is in the immediate vicinity of St. Albans and is on land presently owned by the National Harbours Board.

Access to the site is possible by road. The area is served by the Bay D'Espoir highway, route 360, which connects with the Trans Canada Highway at Bishops Falls.

The harbour surrounding the site is considered very shallow and is backed by fairly steep land. At present no industrial use is being made of the site and the land is vacant of any houses.

St. Albans, the closest town also has the largest population in the region. The total population for the area in 1976 was 4,407 of which 2,040 persons resided in St. Albans. Milltown the second largest town had a population of 1,325.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	0
2.	Protected Area (Bay D'Espoir)	2200 acres
3.	Channel Depths	120 ft.
	Harbour Depth	300 ft.
4.	Channel Widths @ 33 ft.	1000 ft.
	Approach Entrance @ 33 ft.	10,600 ft.
5.	Turning Basin	-

6. Existing Wharfage and Docks:

The only docking facility in close proximity to the site is at St. Albans. This is an 800' x 350' government wharf which is presently being used primarily by CN coastal vessels. This wharf penetrates 400 ft. out from shore to an 120 ft. water depths.

7. Ice Restricted Access:

The waters of the Bay D'Espoir fiord are very calm and during the winter from early February to mid March it freezes north of Roti Point. This ice is usually no thicker than 20 -35 cm which can be broken up.

8. Wave Restricted Access:

No data is available on wave height or storm surge for the site. The wave height and storm surge has been predicted at 10 and 3 feet respectively for Hermitage. Due to the substantial degree of natural shelter wave heights are estimated in the 3 foot range.

9. Wind Direction and Speed:

The maximum observed hourly wind speed is from the northwest at 36 miles/hr. St. Albans is located far inland from the open sea and is therefore sheltered from most winds from the south to northwest.

10. Fog:

The annual incidence of fog in the area is predicted at

90 days or occurring for 25% of the time.

11. Currents:

No information on currents in Bay D'Espoir is available. It is believed that no surface currents of any severity are known to exist in the Bay, but current profiles at varying depths and positions along the Bay should be conducted.

12. Tidal Variation:

The maximum tidal range at the port of St. Albans is listed at 7.1 ft. The tidal range at the site is expected to be of similar magnitude.

13. Seabed Conditions:

Surveys of seabed conditions need to be conducted in the area and bottom sediment samples collected to establish local conditions. Possibly sea bottom conditions at the site consist of mud overlying rock.

14. Proximity to Drilling/Production Activity: -Unimportant.

15. Land Availability Foreshore:

As mentioned earlier, the site is a very shallow harbour backed by fairly steep land.

16. Industrial Land Availability:

The actual site has yet to be defined. In order to attain any amount of flat land it will be necessary to fill in the existing harbour. This would create a site of approximately 240 ha (600 acres).

17. Topography:

The area contains substantial amounts of sand and gravel to the northwest of St. Albans and a veneer of till over the remainder of the area. At present existing reserves of aggregate are under pressure from encroaching housing development.

Physical and Social Infrastructure

18. Water Supply:

Domestic water is supplied to the town of St. Albans from 5 artesian wells, with a capability of supplying a population of 3000. The annual water consumption in the town is 82.1 million gallons and the design flow is 277,000 gals./day. **Swanger Brook which runs into the** site would perhaps be a more reliable and nearer source of water than St. Albans.

19. Power Supply:

Electric power is generated at a location near the site by Newfoundland Hydro. Power distribution is adequate and a load of 3-4 megawatts can be provided.

20. Sewage Disposal:

There is an existing sewage system in St. Albans,with a treatment plant, serving 350 households with another 450 units proposed for servicing. Since the proposed development would take place at a waterfront site presumably it would be best to have its own system with a treatment facility.

21. Solid Waste Disposal:

The municipality of St. Albans operates a landfill dump approximately 4 miles from the town. This disposal site is presently servicing a population of 2235.

22. Housing:

Most houses at St. Albans are owner occupied. In 1976 there were 335 houses, 195 of which were without adequate sanitary facilities. Any major influx of workers into the area could not be handled by existing housing units.

There is an existing construction camp known as Camp Boggy, which was used by Newfoundland Hydro during the development of the power station in the area. It is located near Northwest Brook approximately 3 km off the main highway. The site also has its own water and sewer system.

23. Schools:

St. Albans has a primary, elementary and a high school operated by the same board. These schools have a combined enrollment of 709 and 35 teachers on staff. An approximate increase in capacity of 200 pupils could probably be handled at the present time.

24. Vocational Schools:

No technical education can be gotten in the area. The closest vocational school is at Grand Falls, approximately 180 km away.

25. Access to Medical Facilities:

St. Albans has a medical clinic with an x-ray unit. There are 2 doctors and 6 nurses in the town. The municipality provides 2 ambulances to transport emergency cases to the nearest hospital at Grand Falls.

26. Highway Access:

The proposed site is accessible by route 360 off the Trans Canada at Bishops Falls. This road known as the Bay D'Espoir Highway is paved to St. Albans and is accessible year round.

27. Rail Access:

There is no railway to the site. The nearest rail junction is at Bishops Falls, approximately 120 miles away.

28. Airport Access:

The nearest D.O.T. airport is Gander international, 150 mi. to the north. There is also an airstrip at St. Albans near Long Pond, capable of handling DC-3 aircraft. This airport site has sufficient land for expansion, for warehousing and other related activities.

Environmental Preview

29. Natural Environment:

The site is located in the moose management area No. 25, the Bay D'Espoir area. This area is estimated to have a density of 0.2 moose per sq.km. Caribou are also found in the area. Up to 2.5 animals per square km. The best moose and caribou habitat occurs in the vicinity of the headwaters of the Conne and By du Nord rivers. During 1979 there were 250 moose licences and 350 caribou licences issued for the Bay D'Espoir region.

Three rivers in the area of the proposed site are considered popular salmon fishing areas; Little River, Conne River and Southeast Brook. In 1977 the combined landings at Conne River and Southeast Brook were in excess of 1,900 salmon.

Seabirds and Waterfowl

The site is located 48 km inland from the coast in Bay D'Espoir and therefore it is not frequented by most seabird species. An area to the north of the site is a productive waterfowl habitat, but is too far away from the proposed development to be directly affected.

Fisheries

The Bay D'Espoir area plays a minor role in the province's fishing industry. In 1979 the total area had only 25 fishermen making a part-time living from the fishery. Thirty-two of these used boats less than 20 ft. while 25 others operated fishing vessels in the 20-35 ft. range. Landings were around 176,625 lbs. contributing approximately $58,000 to the local economy. These fishermen fish primarily out at the entrance to Bay D'Espoir as fish stocks rarely migrate as far into the Bay as the proposed site.

Agriculture

The soils throughout the Bay D'Espoir area are designated as having the potential to become productive agricultural land. At present these soils have no usage for the commercial production of arable crops.

Forestry

The land around the site ranges from a moderate to a high capability for forestry. There are three sawmills in the area that produces a total of 505,348 f.b.m. These operations rely on spruce and fir trees found on Crown lands. Cutting operations are usually carried out during the winter months with processing taking place between April and late September.

Recreation

At present the proposed site has no recreational usage. There is a Provincial Park at Little River Pond and there are licenced salmon rivers in the area.

30. Acoustic Change:

The actual location for the proposed development has not been chosen. However, there are several residential dwellings in close proximity to the site.

31. Aesthetic Impact:

Unknown

Social and Economic Considerations

32. Community Services:

There are limited facilities in place at St. Albans which would have to be drastically upgraded if St. Albans is chosen to service the proposed site.

33. Demographic Change:

There are several communities which are included in the Bay D'Espoir region giving the area a total population of 4,407 in 1976. Almost half of these people reside in St. Albans which had a population of 2,040. Milltown, the second largest town, had approximately 1400 people during 1976. This region especially at Milltown experienced a large influx of people between 1966 and 1971 attributed to the hydro electric construction project in the area.

Over the next ten years no major fluctuations in the regional populations are expected nor is significant in-migration or out-migration projected.

34. Labour Force Characteristics:

The Bay D'Espoir area is reported to have one of the highest rates of unemployment in the Province. Traditionally the region supported a major sawmilling industry, however, as this industry declined a large influx of construction labourers settled in the area to support the hydro construction project. The result is that with little or no construction activity happening in the area at present, most of these workers are now unemployed.

Pre-Conditions for Site Suitability

35. Constraints:

- the actual site area has yet to be defined.
- a sewage treatment system will have to be provided to the site.
- it is doubtful whether the town water system at St. Albans can be used to supply the site.
- there appears to be a general lack of developable land in the region.
- an assessment will have to be made of the possibility of reactivating the construction camp at Camp Boggy.
- the social effects of bringing another short term construction project to the area needs to be addressed.

36. On Site Development Costs

a) Concrete Platform Construction

Wharf	$ 3,500,000
Graving Dock	21,000,000
Water Supply	2,200,000
Contingencies	1,400,000
Total	$28,100,000

The cost of social, local and internal facilities/ services will be extra.

b) Seel Platfrom Construction

Wharf		$ 3,500,000
Water Supply		2,000,000
Contingencies		300,000
	Total	$ 5,800,000

The cost of local, social and internal facilities/ services are extra.

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.7	11.6	13.4	15.2	17.0	18.9
0	11.9	13.7	15.5	17.3	19.2
3	12.2	14.0	15.8	17.7	19.5
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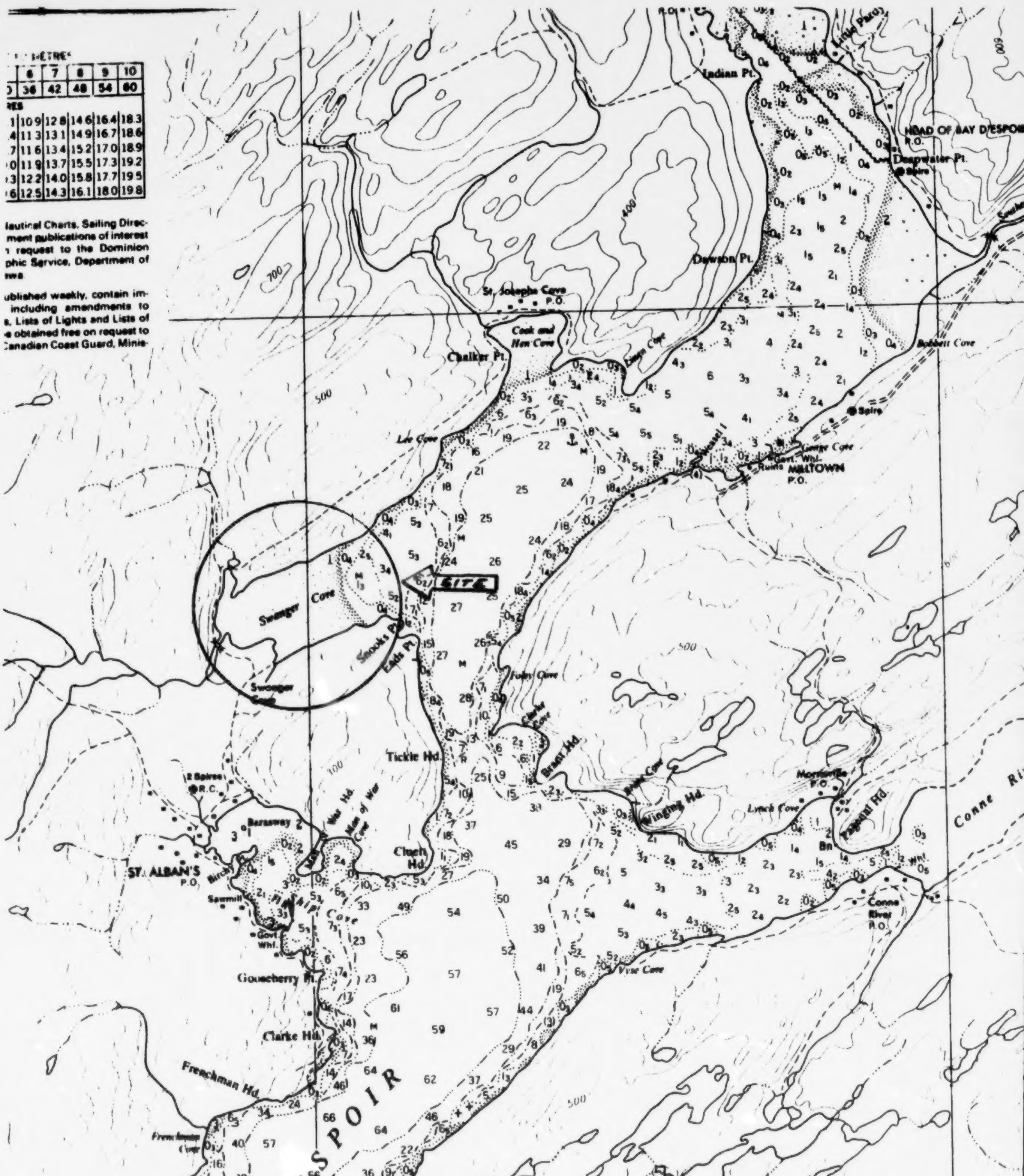
Indian Pt.
Little Pass
HEAD OF BAY D'ESPOIR
P.O.
Deepwater Pt.
Spire
Dawson Pt.
St. Josephs Cove
P.O.
Cook and Hen Cove
Chalker Pt.
Lime Cove
Bobbett Cove
Spire
Lee Cove
George Cove
Govt. Whf.
Ruins
MILLTOWN
P.O.
SITE
Swanger Cove
Swanger Cove
Snooks Point
Eads Pt.
Foley Cove
Clarks Cove
Tickle Hd.
Bragg Hd.
Winging Hd.
Lynch Cove
Morrisville
P.O.
Pogood Hd
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Conne River
P.O.
2 Spires
R.C.
Barasway
ST. ALBAN'S
P.O.
Birch
Sawmill
Govt. Whf.
Man of War Hd.
Man of War Cove
Cluett Hd.
Philip Cove
Gooseberry Pt.
Clarke Hd.
Frenchman Hd.
Frenchman Cove
Vyse Cove
BAY D'ESPOIR
Big Rattling Brook
Island Pt.
Jim Macdonald Cove
Bald Hd.
Collins Hd.
Ironbound Cove Hd.
700
500
400
300
600

ST. ALBAN'S
SCALE 1 : 50,000

PRELIMINARY EVALUATION
ST. ANTHONY
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: ST. ANTHONY

Physical and Economic (critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	80A	+1420 sheltered area (basin)	
- waveheight (3 ft.)	< 3		
- cargo wharf 33' draft (500 ft.)	none	to be constructed	
- supply wharf 20' (900 ft.)	900'	to be constructed	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	36'	limited	
- channel width (800 ft.)33'depth	60'	220' @ 25'	
- approach depth (33 ft.)	900'		
- turning basin (1000 ft.)	1600'		
FORESHORE AREA (20 A)	< 20A	requires infilling	
INDUSTRIAL AREA (200 A)		to be developed	
ICE FREE (5% interference)		4 or 5 months blocked	
PROXIMITY TO DEVELOPMENT	300+	to Labrador site	2
TRANSPORT NETWORK			
- highway	av.	new highway	10
- rail	none		0
- air	Gander Deer Lake	St. Anthony small planes commercial service	5
SOCIAL AND ENVIRONMENTAL (ranked)			
EXISTING INFRASTRUCTURE			
- schools		little capacity to absorb extra	1
- vocational schools	on site	low in industrial orient.	0
- medical facilities	on site	full hospital	10
- housing (200)	200+	to be developed-unserviced	5
- power supply			10
- sewage disposal		would be developed	0
- solid waste disposal		site would need to be dev.	0
WATER SUPPLY		with upgrading may be suff.	3
QUALIFIED LABOUR			
- construction (200)	1700	job position	10
- fabrication (100)		422 const., 21 fab.	2
LAND USE COMPATIBILITY			
- fishing		partial offshore plant	7
- forestry		no saw mills	10
- agriculture		no potential	10
- salmon rivers			10
- wildlife			10
CAPITAL COST			

ST. ANTHONY

General Description

St. Anthony is situated on the eastern side of the Great Northern Peninsula just north of Hare Bay. The harbour can be approached in a southwesterly direction from St. Anthony Bight and after some 500 metres turns abruptly towards the northwest for another 2.3 km.

The Town of St. Anthony is located on either side of the harbour and the site being proposed lies on the south-west side between the wharves owned by Transport Canada and the International Grenfell Association. Since the site is located on a shoal and covered by up to 3 metres of water, infill would be required. This process could reclaim 5.5 hectares and the potential exists for additional area by infilling adjacent coves.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	80 acres
2.	Protected Area (entire basin)	1420 acres
3.	Channel Depth	36 ft.
	Harbour Depth	40 - 45 ft.
4.	Channel Widths - 25 ft.	220 ft.
	- 33 ft.	60 ft. (limited)
	Approach Entrance - 33 ft.	900 ft.
5.	Turning Basin Diameter	1600 ft.

6. Existing Wharfage and Docks:

	Length	Draft
Public:		
Transport Canada	480 ft.	15-21 ft.
Municipal Wharf	105 ft.	18 ft.
Private:		
A.H. Murray & Co.	81 ft.	17 ft.
I.G. A.	88 ft.	10-14 ft.
Fishery Products	195 ft.	13-15 ft.

7. Ice Restricted Access:

Usually the harbour freezes over by early January and remains ice bound for five months. In May an icebreaker is dispatched to expedite break-up. On average St. Anthony has 115 days with ice of 1/10 or greater concentration.

8. Wave Restricted Access:

St. Anthony Harbour is protected from waves from any direction.

9. Wind Speed and Direction:

The prevailing winds at St. Anthony are out of the southwest and west with an average speed of 20 km/hr. During winter months northerly winds with average speeds of 26 to 28 km/hr are common.

10. Fog:

As is the case elsewhere, fog is largely a summer phenomena.

11. Currents:

No specific information available.

12. Tidal Variation:

Tides have an amplitude of 1.4 m at St. Anthony and are not considered unusual.

13. Seabed Conditions:

A detailed survey has not been conducted but the bottom of the harbour is probably gravel on rock. Whether or not the proposed site could support landfill without slumping has yet to be determined.

14. Proximity to Drilling Activity:

St.Anthony is 540 km from Paddon Hughes acreage off Hopedale.

15. Land Availability Foreshore:

The proposed site after infill would contain 5.5 ha with a reserve of another 5 ha.

16. Industrial Land Availability:

There is little serviced land for industry in St. Anthony, although several potential sites have been identified.

17. Topography:

Less than a mile from shore on both sides of the harbour, steep hills quickly rise to a general elevation of 80 m. One of these, St. Anthony Hill on the southside of the harbour entrance, reaches to 125 m.

Physical and Social Infrastructure

18. Water Supply:

There is a piped water supply and two resevoirs - St. Anthony's Pond and Frenchman's Pond. The latter system is in a poor state of repair while the capacity of St. Anthony's Pond (425,080 m^3 per year) is insufficient to meet both the requirements of the town and the fish plant (420,000 m^3 per year). The system is being enlarged and the connection of Western Long Pond will increase the capacity by 1.7 million m^3.

19. Power Supply:

With upgrading may be sufficient.

20. Sewage Disposal:

The sewer system is comprised of 17 unco-ordinated sub-systems which were poorly designed and constructed. There is no additional capacity for industrial users.

21. Solid Waste Disposal:

The sanitary landfill area occupies approximately 3 hectares and is also used by Goose Cove, St. Anthony Bight and St. Carol's. Barring unusual growth, the site could have another 10 years of use.

22. Housing:

There are some 781 dwelling units in the Town of St. Anthony but the vacancy rate is very low.

Four sites totalling 25 hectares are available for development and could accommodate up to 375 dwelling units. Two additional tracts covering 15 hectares are available but would be more expensive to develop. None of the land is serviced.

23. Schools:

St. Anthony has an elementary school and a high school with a total enrollment of 1,040 during 1980-81. These facilities are considered adequate and no expansion has been planned.

24. Vocational Schools:

There is a District Vocational School in St. Anthony which provides basic vocational training with low industrial orientation.

25. Access to Medical Facilities:

There is a large hospital in the Town with 120 beds, and staffed by 14 physicians, 2 dentists, 62 nurses and 57 assistants.

26. Highway Access:

The Great Northern Peninsula Highway links St. Anthony with the T.C.H. at Deer Lake some 440 km. to the south. Only a few kilometres of the Great Northern Peninsula Highway remains unpaved.

27. Rail Access:

There is no rail line to St. Anthony.

28. Airport Access:

St. Anthony Airport is approximately 25-30 km west of the town and has one paved runway 1200 m long. The Airport is serviced 3 times a week by Labrador Airways from St. John's via Gander.

For the past few years Transport Canada has been considering a plan to construct a new regional airport near Hare Bay.

The nearest other airport is located at Deer Lake 435 km to the south.

Environmental Preview

29. Natural Environment:

While the proposed site is largely undeveloped it is adjacent to a residential area and hospital zone.

Fisheries

There are 576 fishermen operating out of St. Anthony area using 321 boats, 18 of which are in excess of 46 ft. in length.

30. Acoustic Change:

Considering the proximity of the site to hospital and residences, acoustic changes could have considerable impact.

31. Visual Aesthetics:

Property owners may object depending on level of development.

Social and Economic Considerations

32. Community Services:

In that St. Anthony and adjacent communities are somewhat isolated at distal end of the Great Northern Peninsula, services now being provided could be severely strained if development,once defined, required a substantial influx of workers.

33. Demographic Change:

St. Anthony is larger than any other community on the Great Northern Peninsula or the Labrador Coast. Its population has been reported as 2,600 (1971 census), 2,987 (1976 census) and 3,225 (1980 Estimate). Together with the other communities which comprise Census Sub-Div. 9, the total is 7,500.

At the present time, the unemployment rate is low and about 400 jobs are filled by residents of nearby communities.

34. Labour Force Characteristics:

Of the 1,700 jobs available in St. Anthony, approximately

75% are provided equally by fish processing and institutional organizations. Retail and service outlets provide another 13% while construction and fish harvesting companies comprise 6 and 3.5% respectively.

Residents of St. Anthony fill approximately 75% of the total number of jobs available.

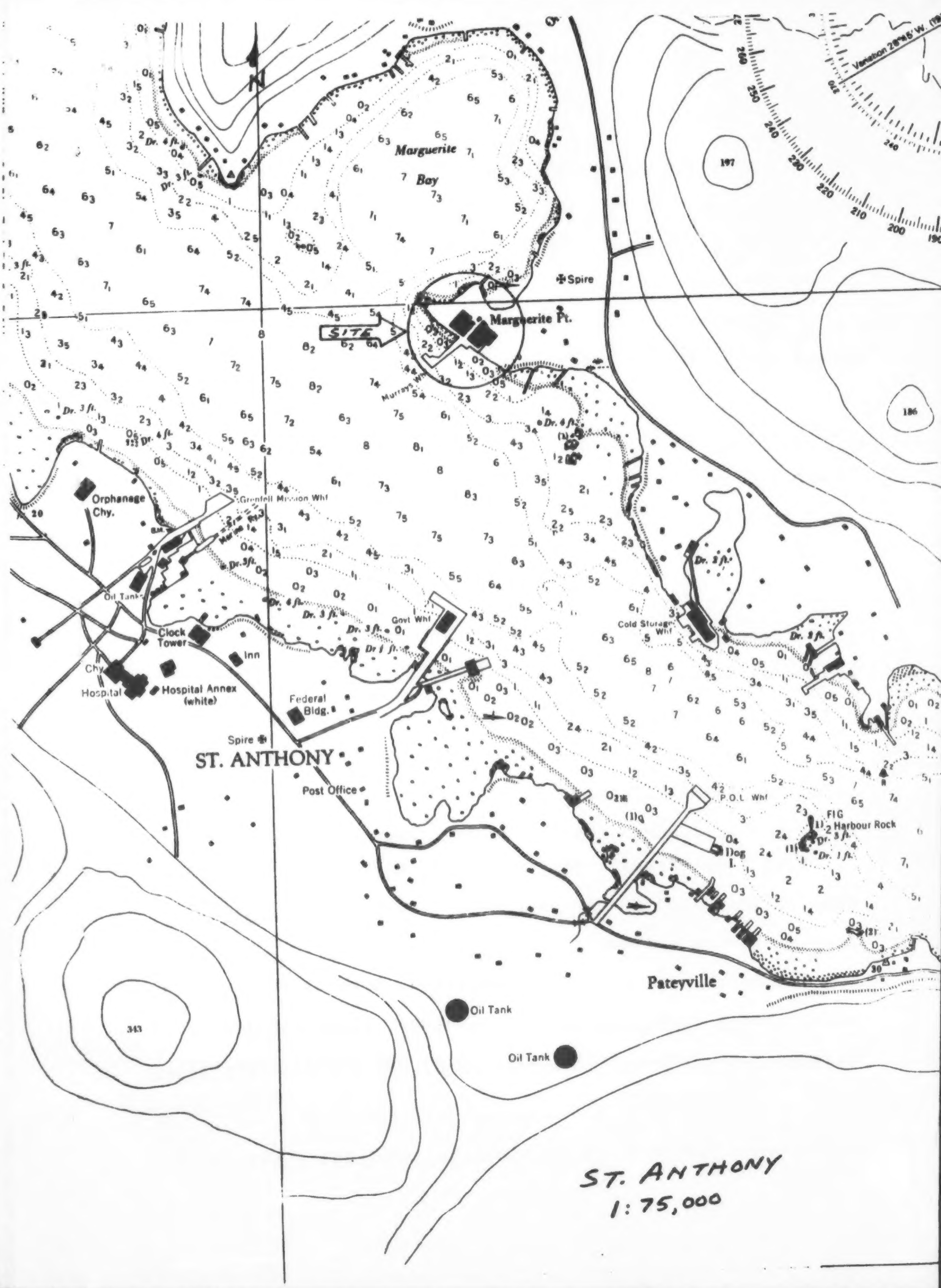
Pre-Conditions for Site Suitability

- detailed engineering studies are needed to examine the suitability of the site for infill.
- water, sewage and solid waste disposal systems probably need upgrading.
- the amount of serviced land for industrial, commercial and residential usage may have to be increased.
- the relatively large distances between St. Anthony and other major centres in the Province might require upgarding of the Airport facilities.

On Site Development Costs (Satellite Supply Base)

With the exception of a municipal water and sewer system, the facilities in St. Anthony are deemed adequate for the operation of a satellite supply base.

The water system is being enlarged, however no proposal exists for a sewer system. Costs appear to be limited to internal industrial facilities, local and social services required.


N
Marguerite
Bay
SITE
Marguerite Pt.
Spire
Murrays Whf
Orphanage
Chy.
Grenfell Mission Whf
Oil Tank
Clock
Tower
Inn
Chy
Hospital
Hospital Annex
(white)
Federal
Bldg.
Govt Whf
Spire
ST. ANTHONY
Post Office
Cold Storage
Whf
P.O.L. Whf
FIG
Harbour Rock
Dog
I.
Pateyville
Oil Tank
Oil Tank
Variation 28°45'W.

ST. ANTHONY
1:75,000

PRELIMINARY EVALUATION
ST. MARY'S
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1
SUMMARY - SUPPLY/SERVICE BASE

Location: ST. MARY'S

A. Physical and Economic(critical)	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			Critical
- protected area (150 A)	1350A	entire bay	
- waveheight (3 ft.)	6'	south west fetch	
- cargo wharf 33' draft (500 ft.)	none	to be constructed	
- supply wharf 20' (900 ft.)	none	to be constructed	
2. ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	60'	sufficient	
- channel width (800 ft.)	3300'	sufficient	
- approach depth (33 ft.)	7500'	"	
- turning basin (1000 ft.)	4200'	"	
. FORESHORE AREA (20 A)	>20A	needs grading (virgin)	
. INDUSTRIAL AREA (200 A)	>200A	" " "	
. ICE FREE (5% interference)		rare problems	
. PROXIMITY TO DEVELOPMENT	275		8
. TRANSPORT NETWORK			
- highway		upgrading required	5
- rail		Holyrood (not sufficient)	5
- air	St.John's	60 miles distant	4
. SOCIAL AND ENVIRONMENTAL(ranked)			
. EXISTING INFRASTRUCTURE			
- schools		info. not available	2
- vocational schools	St.John's	, Clarenville, Seal Cove	5
- medical facilities		St. John's	0
- housing		no organized development	0
- power supply		upgrading likely required	5
- sewage disposal	none	required	0
- solid waste disposal		required	0
. WATER SUPPLY	supply	2 local systems	10
. QUALIFIED LABOUR			
- construction (200)	low		10 (est)
- fabrication (100)			2 (est)
. LAND USE COMPATIBILITY			
- fishing		868 fishermen & processing	5
- forestry		none	10
- agriculture		no conflict	10
- salmon rivers		no resource	10
- wildlife		" "	10
CAPITAL COST			

ST. MARY'S

General Description

The site proposed for development is on the southeastern shore of St. Mary's Harbour between Coalpit Point and Langley Cove. The contours run parallel to the shoreline rising to 100 feet at a 6 to 20% slope. After the first 100 foot contour is attained it continues in elevation to 150 feet on a more gently slope. The land is reported to be frozen but this cannot be confirmed. St. Mary's is one of the two places nominated on the southern Avalon for onshore oil development.

The land is vacant but contains a water line believed to be 6 inches in diameter. Vegetation consists mainly of young coniferous trees with some grasses. The site is well separated from existing residential areas. Existing road access is poor.

Decription of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area (headland to headland @ 33 ft.)	0 acres
2.	Protected Area (Entire Bay)	1350 acres
3.	Channel Depth Harbour Depth	60 ft. 120 ft.
4.	Channel Width (@ 33 ft.) Entrance Width (@ 33 ft.)	3300 ft. 7500 ft.
5.	Turning Basin Diameter (@ 33 f.)	4200 ft.
6.	Existing Wharfage and Docks:	

No public or leased/private wharf facilities suitable or available for onshore oil development. Fishermen's wharf only.

7. Ice Restricted Access:

The south coast of Newfoundland is generally considered as having open water year-round except for brief ice intrustions. Eastern Newfoundland or offshore ice may round Cape Race and move as open pack ice to the French Islands. These intrusions which occur in March seldom affect the coast 30 or 40 miles beyond Cape Race.

Consequently ice should seldom present itself in St. Mary's Harbour and it is seldom thick enough to interfere with anchorage. South and SW winds tend to pack the harbour with ice when its occurs offshore.

8. Wave Restricted Access:

The greatest effective fetch available is from the west or southwest direction. A fetch of 15 nautical miles is estimated to give a wave height of six to seven feet.

9. Wind Direction and Speed:

The prevailing wind direction from west to south and mainly SSW is estimated to occur some 51% of the time based upon Argentia statistics. The maximum average wind speed is recorded at 20.3 m.p.h. with a maximum observed hourly speed of 70 m.p.h. from the north with 85 m.p.h. observed gust speed. St. John's statistics tend to provide prevailing winds of the same general direction.

10. Fog:

While detailed information is not available on fog it would appear St. Mary's Harbour would receive similar conditions with respect to fog as the remainder of the Avalon. Since the prevailing winds can be classified as onshore,foggy conditions may persist.

11. Proximity to Drilling/Production Activity:

St. Mary's is located about 275 miles from the Hibernia Oil field.

12. Foreshore Land Availability:

While a large tract of land is available the slope ranges between 6 to 20% and some cut/fill would be required to provide suitable land.

13. Industrial Land Availability:

as above

14. Topography (surficial geology):

Geologic maps indicate conglomerate, slate, siltstone, greywacke and minor volcanic groups form the main geological structure.

Soils generally consist of sand and gravel till with some organic soils. Drainage can range from poor to moderately well drained.

Physical and Social Infrastructure

15. Water Supply:

A domestic water supply to St. Mary's runs adjacent to the site and may serve as an industrial source. Domestic, piped water is also available at Gaskiers.

16. Power Supply:

Existing communities in the area are serviced with electrical power. The capability of these existing facilities to handle industrial usage has not been determined at this time.

17. Sewage Disposal:

Municipal sanitary sewage or storm sewers are not available. At the present time a sanitary sewer proposal is being considered for St. Mary's. Storm water sewage would possibly be treated in a storm water pond on site and discharged into the harbour.

18. Solid Waste Disposal:

Disposal site required.

19. Housing:

Most of the housing within the area are single residential units which are now occupied. As far as can be gathered no area has been set aside for residential development.

20. Schools:

Information not available although an expansion may be required with an influx of families, if it occurred.

21. Vocational Schools:

Although vocational education is not available within the community it is expected use would be made of such schools in St. John's, Clarenville, Carbonear and Conception Bay.

22. Access to Medical Facilities:

It is expected use would be made of the regional facilities in St. John's since a local hospital is not available.

23. Transporation Systems:

St. Mary's is connected to the Trans Canada Highway by route 90. This paved collector road some 25-30 miles long is of poor alignment with low speeds and would require upgrading.

The main railline passes through the town of Holyrood some 30 miles to the north. Consequently, rail transport would play a small role in any operation at St. Mary's.

Air transportation is available through a commercial airport, administered by M.O.T. and is located in St. John's, some 60 miles to the northeast.

24. Currents: -unknown

25. Tidal Variation:

The amplitude for large tides has been estimated at 6.8 feet in St. Mary's Harbour. Tides of this magnitude are not deemed significant with regard to the operation of supply/service boats.

Environmental Preview

26. Natural Environment:

Existing facilities in St. Mary's are mainly put to residential use and little environmental impact has been felt to date. Construction of a supply/service base would be the first major industrial activity seen in this area. The development area appears to be covered with young coniferous growth and grasses. Little conflict is forseen with regard to land use.

Wildlife

The specific site and surrounding area has a high and low capability to support caribou and moose respectively. While it is not known if animals do utilize the proposed development area the amount of land required for foreshore and industrial use amounting to some 220 acres is thought to be minimal with respect to the overall area. It should be noted a wilderness area is located some 5-8 miles inland from the proposed site.

Seabirds and Waterfowl

Seabirds are common around coastal Newfoundland and St. Mary's should be no exception. Since seabirds are the most vulnerable natural species any potential oil spill would provide conflict. However, this is judged to be insignificant. A Canada Goose Habitat is located about 8 miles inland.

Salmon Rivers

There is no salmon resource known in the area.

Forestry

While the site does contain young coniferous trees the overall area including the proposed industrial area has severe limitations which preclude the growth of commercial forests. Consequently, no conflict is seen to exist.

Agriculture

Some sheep farming and perhaps cultivation exists within the community of St. Mary's. Generally speaking this area has moderate priority for agriculture and good yields are obtainable after soil improvement practices are in place. Stones and topography are seen as the limiting factors in this area. Conflict is not seen to exist between the proposed industrial area and agriculture development area.

Fisheries

Fish landings of 67,330,590 pounds with a value of $7,579,803 were recorded in 1980. Some 868 fishermen for a 190.9 man year effort were involved. Some 457 boats were used in the fishery. In excess of 30,000,000 pounds of fish were processed during 1979-80 for a 508 manyear effort.

Local fishermen are reported to use St. Mary's Harbour as a catch area or fishing ground. In addition ,fishing does occur up to 10 miles offshore but it is understood 95% of the effort within St. Mary's itself occurs as an inshore fishery.

Recreation

Land of low capability for recreation exists on or near the site consequently no conflict is seen to exist.

27. Acoustic Change:

No impact is forseen with regard to acoustics since a large buffer zone exists between the site and nearby communities.

28. Aesthetic Impact:

No severe impact can be anticipated,although St. Mary's could be classified as scenic.

Social and Economic Considerations

29. Community Services:

The community facilities which do exist in St. Mary's are of a limited nature and upgrading/expansion would be required.

30. Demographic Change:

The population of St. Mary's and Gaskiers is estimated at 1000 people. Although this region is within commuting distance of Conception Bay some increase in population would be inevitable. As a result and depending on the number of people moving in there would be some change in the community.

31. Labour Force Characteristics:

While statistics are not available with regard to the labour force, it is estimated there are about 100 tradesmen in the area. These range from carpenters, electricians, welders and heavy equipment operators. All of whom find employment outside the community, from St. John's to Alberta to Northern Canada. The average income is "reported" to be around $15,000. A seasonal fish processing plant is located within the area.

Pre-Conditions for Site Suitability

32. Constraints:

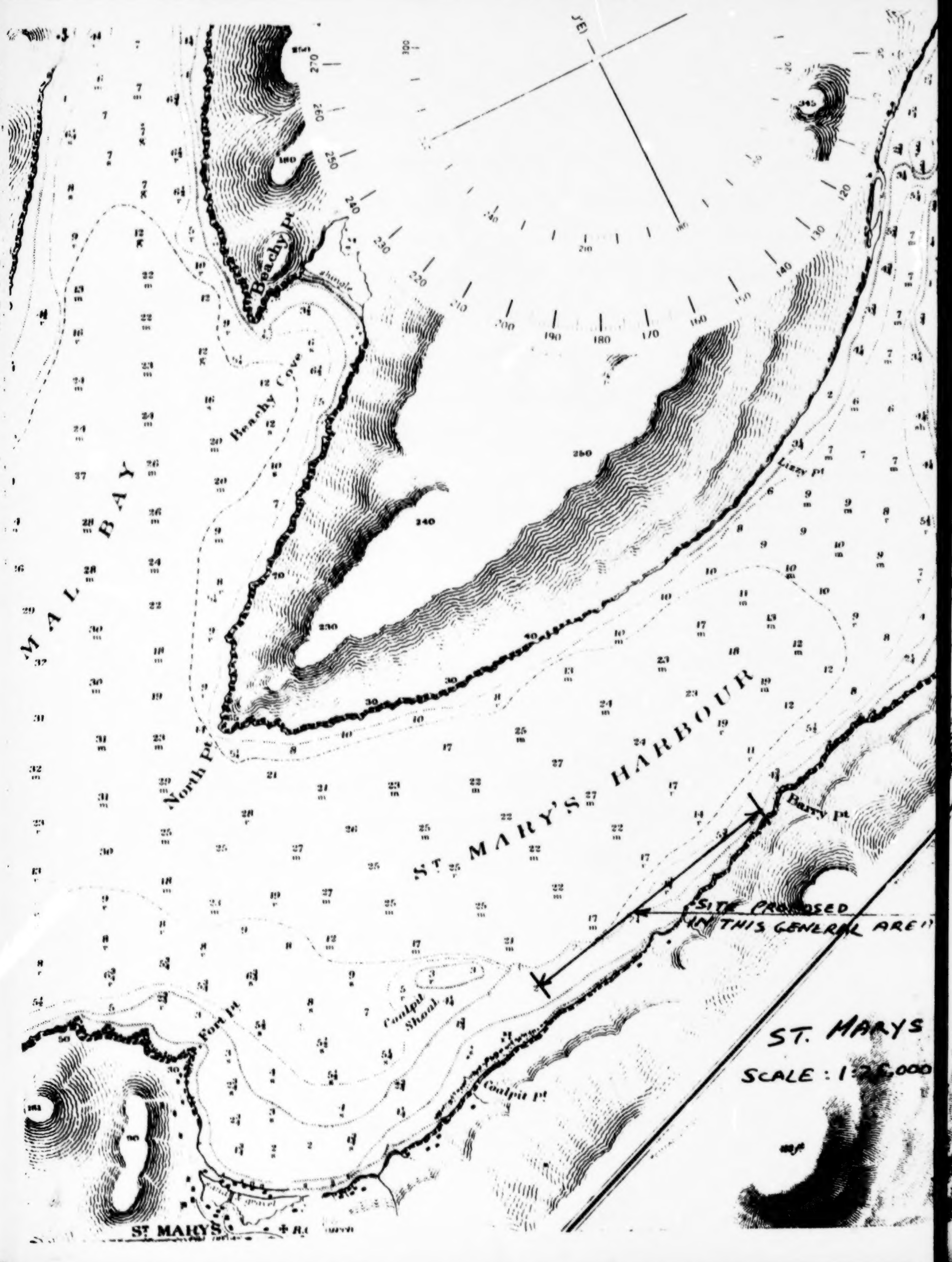
- municipal upgrading package would be required to go hand in hand with industrial development.

- sewer services would be required on site.
- power supply upgrading may be required.
- solid waste disposal site required.
- a study should be conducted to pinpoint land services and social services required as a result of any proposed development.
- effective municipal zoning should be implemented by the Town Council.
- a Town Council should replace the existing community council and a municipal plan introduced.
- accommodations for workers and/or families may be required and this should be investigated and acted upon.
- due to the moderate capability of land in this area to support caribou and the close presence of the Avalon wilderness area some study should determine the effect of development on the adjacent wilderness area.
- it is understood locals use the harbour as a fishing ground and some conflict may exist with regard to safe navigation.

33. On Site Development Costs

- wharf		$ 9,800,000
- Contingencies		500,000
	Total	$10,300,000

The cost of providing industrial facilities, local and social services will be extra.


MAL BAY
Beachy Pt
shingle
Beachy Cove
North Pt
ST. MARY'S HARBOUR
Lizzy Pt
Barry Pt
Coalpit Shoal
Fort Pt
Coalpit Pt
ST MARYS

SITE PROPOSED IN THIS GENERAL ARE

ST. MARYS

SCALE : 1:25,000

PRELIMINARY EVALUATION
ST. JOHN'S HARBOUR
AS A LOCATION FOR
SUPPLY/SERVICE BASE

TABLE 1

SUMMARY - SUPPLY/SERVICE BASE

cation: ST. JOHN'S HARBOUR

Physical and Economic(critical)	Actual	Remarks	Ranking
SHELTERED HARBOUR			Critical
- protected area (150 A)	150A	sufficient	
- waveheight (3 ft.)		protected	
- cargo wharf 33' draft (500 ft.)	N.H.B.	controlled by N.H.B	
- supply wharf 20' (900 ft.)	"	" "	
ADEQUATE DEPTH			
- harbour depth (33 ft.)			
- channel depth (33 ft.)	36'	sufficient	
- channel width (800 ft.)	200'	insufficient	
- approach depth (33 ft.)	33'	800' wide (sufficient)	
- turning basin (1000 ft.)	2050'	sufficeint	
FORESHORE AREA (20 A)	13.5	insufficient	
INDUSTRIAL AREA (200 A)	240	serviced + other okay	
ICE FREE (5% interference)		rare problems	
PROXIMITY TO DEVELOPMENT	190		10
TRANSPORT NETWORK			
- highway	av.	requires upgrading	10
- rail	av.	not significant	10
- air	av.	sufficient (can be increased)	10
SOCIAL AND ENVIRONMENTAL(ranked)			
EXISTING INFRASTRUCTURE			
- schools (400 vac.)		sufficient	10
- vocational schools		"	10
- medical facilities		"	10
- housing (200 lots)		"	10
- power supply		"	10
- sewage disposal		"	10
- solid waste disposal (20A)		"	10
WATER SUPPLY (36,000 gpd)		"	10
QUALIFIED LABOUR			
- construction		population centre	10
- fabrication			10
LAND USE COMPATIBILITY			
- fishing		moderate conflict	5
- forestry		no conflict	8
- agriculture		moderate conflict	5
- salmon rivers		no conflict	10
- wildlife		no conflict	9
CAPITAL COST			

ST. JOHN'S HARBOUR

General Description

The port of St. John's is located on the east coast of the Avalon Peninsula in the City of St. John's, the capital of the Province. The Trans Canada is the major highway running 565 miles from St. John's to Port aux Basques and, along with an extensive system of secondary highways, links St. John's with the rest of the Province. The St. John's metropolitan area contains a population of 143,390 people (1976 census).

The climate is moderate and is influenced by the surrounding ocean. Fog is common in the southern and eastern coastal regions and is caused by the meeting of the Gulf stream with the cold Labrador current. Arctic ice blockades the sections of ocean just north of St. John's from mid winter to late spring.

The land surrounding St. John's harbour is very rugged with steep slopes. Land on the south side of the harbour slopes steeply away from the water and restricts usable land on the south side to a narrow strip adjacent to the water's edge. The north side of the harbour is directly adjacent to the city core. This land slopes more gently away from the water's edge and elevations of 150 feet occur 1000 feet or more away. The land surrounding the city consists of relatively flat terrain made up of forests, bogs, barrens and a small amount of farmland.

The four lane divided Harbour Arterial connects the harbour directly with the Trans Canada Highway, 10 miles west. However, road access to much of the St. John's waterfront is very poor for trucks. Truck traffic on local residential streets cause congestion problems and impedes traffic. Rectification will be a major item of expense.

The city is the administrative, institutional and commercial centre of the Province and controls almost half of the total labour force population in its metropolitan area.

The harbour has a well sheltered basin and is excellent for small and medium sized vessels and has served as an offshore supply base since 1971. Restrictions on channel depth and width prevent accommodations of semi-submersible drill rigs but is suitable for supply vessels and drill ships. In 1979,13% of all vessel arrivals were drilling supply vessels and six of the eight rigs operating were supplied out of St. John's. At present there are 10 berths available for supply vessel operations, Piers 12, 14, 22 and 27 (1935 ft.) all private wharfage and has the capacity to serve 14 to 18 drill rigs. Some improvements in water and diesel fuel supply to service supply vessel berths are required. However, for a combined production drilling and exploration program this length could probably support 12-15 drill rigs.

Harvey's Offshore Limited could make available an additional 350 ft. of berthing space for supply vessels. Pier 15, container terminal could direct its container traffic to Pier 16 - bulk shipment terminal depending on cost/revenue picture for alternative operations.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area at 33 ft. draft	150 acres
2.	Channel Depth Harbour Depth	36 ft. 60 ft.
3.	Channel Width (33 ft.) Approach Entrance @ 33 ft.	200 ft. 800 ft.
4.	Turning Basin	2050 ft.

5. Existing Wharfage & Docks: - See Table I

6. Ice Restricted Access:

Normally ice free except in severe winters when easterly winds concentrate field ice and icebergs along the coast and in the narrows. Field ice is generally 6 to 18 inches thick which would not impede ice strengthened supply vessels.

7. Wave Restricted Access:

Harbour is well protected from the adverse effects of wind and waves.

8. Wind Direction and Speed: - unknown.

9. Fog: - Common.

10. Currents: Not conducive to littoral currents.

11. Tidal Variation: - 4.8 ft.

12. Seabed Conditions:

Mostly mud with some rock and gravel.

13. Proximity to Drilling/Production Activity: - 190 miles.

14. Land Availability Foreshore:

Harvey's Offshore Limited has an immediate back-up area of 13.5 acres. Elsewhere around the harbour land is minimal.

15. Industrial Land Availability: - unserviced.

There are several potential heavy industrial sites in the area.

- Octagon Pond - gross acreage-400
- Southwest of the Harbour Arterial-100-200
- East of Torbay Road near the Old Airport- 78
- Lundrigans Concrete East - large

There are as well two serviced light industrial/commercial areas.

- Donovans Industrial Park - Phase III - 150 acres
- Pippy Place, O'Leary Avenue - 90 gross acres

16. Topography: - See Octagon Pond.

Physical and Social Infrastructure

The physical and social infrastructure in the city is more than sufficient to meet demands generated by an offshore supply/service base. Two constraints are the availability and affordability of housing and residential land and the need for improved access to the waterfront to avoid existing congestion in residential and commercial zones.

Environmental Preview

There are more than adequate planning and development controls to ensure that environmental consequences from proposed development are regulated and minimized.

Social and Economic Considerations

St. John's offers an extensive variety of community services and even a high in-migration associated with offshore oil and gas supply and service operations would be easily accommodated or would have a minimal impact in terms of stress on existing services.

It is not anticipated given mobility of present work-force that St. John's will experience more than a moderate increase in population. As well the large labour pool available in the metropolitan area and the history of commuting workers within a fifty mile radius would seem to indicate that labour demands can be met without difficulty.

Pre-Conditions for Site Suitability

Highway Infrastructure

As previously stated, the existing privately controlled facilities in St. John's are capable of handling the projected vessel traffic over the next three years. This, therefore, postpones the need of capital investment by Government for the construction of marine facilities. The existing water and sewer facilities within the City are more than adequate to meet the needs of the supply vessels.

The development of St. John's Harbour as a major service port will eventually require the construction of a significant roadway infrastructure. Immediately required would be improvements to both Portugal Cove Road and Torbay Road to provide airport access at an estimated cost of $3.2 million. Equally important would be a southside access from the Harbour Arterial to the Harbour at a preliminary cost of $1.5 million.

As these latter roadways would probably be required at some future time in the development of St. John's, their actual cost is the difference between the net present value of the investment required for an oil supply base and the net present value of the investment required for normal traffic growth.

Industrial Land

There will be a need to develop industrial land. A report by Colin Karasek Limited indicates that 100 acres of heavy industrial land is required to accommodate mud and cement suppliers, for tubular pipe storage, and repair and fabrication shops, while 108 acres of light industrial land is required for specialists, supply companies and caterers.

The combination of available land, rail and road transport connections to the present and proposed Arterial Road System for the City makes the Donovans and Octagon Pond Areas logical choices for light and heavy industrial development respectively.

The next phase of Donovans, 153 acres with 125 net available for use exclusive of roads, etc.is presently under design. Its estimated cost is $6,400,000.00 including the cost of an overpass across the Harbour Arterial. Subject to funding development can start in June of 1981 with lots becoming available for the 1982 construction season. The expansion would be completed in June of 1983. At present this expansion is contingent on the availability of DREE funding.

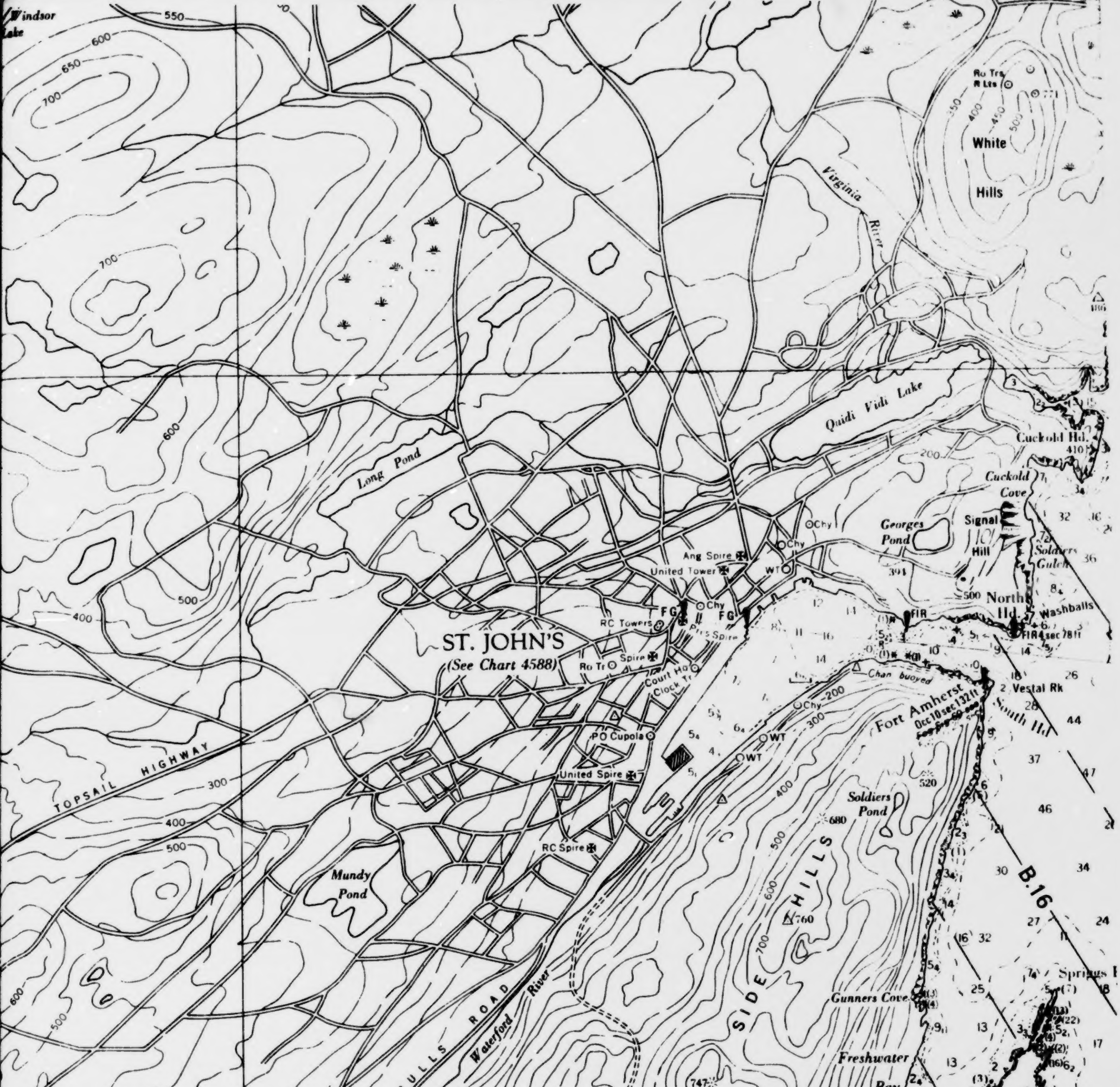
A report submitted in April, 1980, by Proctor and Redfern, to the Department of Industrial Development indicates a cost of $10,000,000 to develop 400 acres of heavy industrial land in the Octagon Pond area. Unfortunately, to develop only 100 acres of this site would still cost in the order of $5,000,000 because of the external service requirements for water supply, sewage disposal, an at grade intersection with Topsail Road and a grade separation intersection with the proposed Conception Bay Arterial extension. In addition, the feasibility of this project is contingent on $1,500,000 being made available to the Town of Paradise to begin construction of a distribution system and a further $400,000 which is required to connect from Paradise to the Waterford Valley and Mount Pearl Trunk Sewer Main.

Highway Development		$ 4,700,000
Industrial Land		13,300,000
	Total	$18,000,000

TABLE 1

BERTHS - PORT OF ST. JOHN's

BERTH		WHARF LENGTH (ft.)	DEPTH ALONG SIDE (ft.)
1.	(N.H.B.)	575	10
2.	(N.H.B.)	540	30
3.	(N.H.B.)	600	30
4.	(N.H.B.)	390	30
5.	(N.H.B.)	525	29
6.	(N.H.B.)	520	20
7.	(N.H.B.)	400	23
8.	(N.H.B.)	500	26
9.	(N.H.B.)	500	24
10.	(N.H.B.)	520	30
11.	(N.H.B.)	510	30
12.	(Harvey Pier No. 1)	375	24
14.	(Harvey Pier No. 2)	500	19
15.	(Harvey Pier No. 3)	350	27
16.	(Furness Withy)	475	25
17.	(N.H.B.)	600	26
22.	(Mobil Oil)	500	22
23.	(Imperial Oil Pier No. 1)	475	25
24.	(Irving Oil)	225	31
25.	(Job Brothers)	450	16
26.	(Imperial Oil Pier No. 2)	200	23
27.	(Bowing Bros.)	500	17
28.	(Gulf Oil)	225	17
29.	(Gulf Oil)	375	17
30.	(Ministry of Transport)	325	17
31.	(Ministry of Transport)	600	23
33.	(C.N.R.)	350	1-19
34.	(C.N.R.)	350	15
35.	(C.N.R.)	300	12
36.	(C.N.R.)	350	19
37.	(C.N.R.)	375	13


Windsor Lake
White Hills
Virginia River
Quidi Vidi Lake
Long Pond
Cuckold Hd.
Cuckold Cove
Signal Hill
Georges Pond
Soldiers Gulch
North Hd.
Washballs
ST. JOHN'S
(See Chart 4588)
Ang Spire
United Tower
RC Towers
Spire
Ro Tr
Court Ho
Clock Tr
PO Cupola
United Spire
RC Spire
Chan buoyed
Fort Amherst
Vestal Rk
South Hd
Soldiers Pond
SOUTH SIDE HILLS
Gunners Cove
Freshwater Bay
Freshwater Bay Pond
Spriggs P
Peggys Bay
Deadmans Bay
B.16
TOPSAIL HIGHWAY
Mundy Pond
BAY BULLS ROAD
Waterford River
Kitty Gauls Brook
Waterford Bridge

CANADA

NEWFOUNDLAND

APPROACHES TO ST. JOHN'S

SCALE 1:37.500

PRELIMINARY EVALUATION
TERRENCEVILLE
AS A LOCATION FOR
CONCRETE PLATFORM CONSTRUCTION

TABLE 3
SUMMARY - CONCRETE PLATFORM CONSTRUCTION

Location: TERRENCEVILLE

A. Physical and Economic	Actual	Remarks	Ranking
1. SHELTERED HARBOUR			
- cargo wharf 500' at 33'	large	entire bay	
- Dock 650'X650' at 33'			
channel width 800'	4200'@ 36'	satisfactory	
- Buildup Site 800' at 260'	1900'@ 270'	satisfactory	
- Tow-out Base			
min depth 425', min width 200'	225'/-	unsatisfactory	
- Wave height, 3'		not known	
- Deep Sink Site 800'wide @660'	2300'@ 660'	satisfactory	
2. FORESHORE AREA (50 A)		landfill required	
3. INDUSTRIAL AREA (200A)		landfill required	
4. ICE FREE		12 months icefree	
5. TRANSPORT NETWORK		upgrading	
- highway	yes	7mi.gravel road,	5
- rail	none	insignificant	0
- air	St.John's	150 miles	0
B. SOCIAL AND ENVIRONMENTAL			
1. EXISTING INFRASTRUCTURE			
- schools	no space	inadequate	0
- vocational schools	Burin	70 miles	5
- medical facilities	clinic	inadequate	0
- housing (200)		could dev. 300 serviced lots	10
- power supply	difficult		0
- sewage disposal		site req. this system	0
- solid waste disposal		" " "	0
2. WATER SUPPLY	adequate		10
3. QUALIFIED LABOUR		Total force 1619	
- **construction** (700)	529	small lab. force	8
- **fabrication** (350)	65	515 const.	2
4. LAND USE COMPATIBILITY		local plants	
- fishing		967 fishermen,	7
- forestry		no potential	10
- agriculture		no potential	10
- salmon rivers		no conflict	10
- wildlife		no conflict	10
C. CAPITAL COSTS			

TERRENCEVILLE

General Description

The town of Terrenceville is located at the head of Fortune Bay on the west side of the Burin Peninsula. It is 7 miles off the Burin Peninsula Highway, 53 miles from Goobies at the junction of the Trans Canada Highway, and 60 miles from Marystown.

The town's population in 1976 was 764 and it is expected that this has increased to about 1000 today.

No specific site has been indicated for the proposed development at Terrenceville. The townsite is very constricted by topography and there is very little land available.

Description of Harbour, Foreshore and Hinterland

1.	Protected Harbour Area	Nil
2.	Protected Area (Entire Bay)	Large
3.	Channel Depths	225 ft.
	Harbour Depth	850 ft.
4.	Channel Widths	4200 ft.
	Approach Entrance	7,800 ft.
5.	Turning Basin	

6. Existing Wharfage and Docks:

A government wharf at Terrenceville is used on a continuous basis by C.N. coastal vessels operating from the port on a turn-around passenger schedule.

7. Ice Restricted Access:

Terrenceville has an ice-free harbour for 12 months of the year.

8. Wave Restricted Access:

No data is available on actual wave conditions at the local site.

9. Wind Direction and Speed:

The maximum wind speed for Terrenceville is not expected to exceed 145 km/hr from the westsouthwest . The maximum wind speeds will probably occur in the period from November to March with the mean maximum speeds over 80 km/hr. for these months. Average monthly wind speeds for July could be from 15-20 km/hr. and for December 25-30 km/hr.

10. Fog:

Fog occurs quite frequently in the Terrenceville area, especially on the Burin Peninsula. The annual incidence of fog is probably in the order of 100 days.

11. Currents:

No information is presently available on local current conditions.

12. Tidal Variation:

The tidal amplitude at Terrenceville ranges from 6¼ ft. to 6½ ft.

13. Seabed Conditions:

No information available. Possibly conditions are characterized by mud and sand overlying rock.

14. Proximity to Drilling/Production Activity: Unimporatant.

15. Land Availability Foreshore:

As mentioned earlier, a specific site has not been chosen for the proposed development at Terrenceville. The townsite is constricted and there is very little land available for further development of any kind. Basically, the landform ranges from hilly to mountainous with the harbour located in a valley.

16. Industrial Land Availability:

Whether a site is chosen on the north or south side of the harbour, it appears that considerable landfill would have to be carried out to achieve the required 60 ha site. If the site is to be on the south side of the harbour, such a development would be extremely close to the town.

17. Topography:

The area is probably characterized by a shallow overburden of glacial origin overlying rock with some alluvial deposits at the mouth of the Terrenceville river. The vegetation consists of grass, shrubs and coniferous trees.

Physical and Social Infrastructure

18. Water Supply:

The town has a 500 acre watershed. Water is obtained from a river flowing through the centre of the town. The capacity of this system during the dry season is 290,000 gallons per day. The town's need at the present time is 50,000 gallons per day which leaves a surplus of 240,000 gallons per day.

19. Power Supply:

Power is supplied to the area by Newfoundland Hydro. The capacity of this transmission for industrial usage is uncertain.

20. Sewage Disposal:

There is a sewage disposal system presently servicing most of the town.

21. Solid Waste Disposal:

Solid waste is disposed off by the municipality at a landfill garbage dump just outisde of the town.

22. Housing:

The maximum number of building lots remaining in Terrenceville on a serviced basis is 300. If workers have to come to the area they would presumably best be housed in a construction camp either on the site or in a nearby location.

23. Schools:

There are three schools at Terrenceville served by the Roman Catholic School Board. During 1980 these schools had total enrollment of 1450 pupils and 72 teachers on staff. At present time all schools are being utilized to full capacity with expansion at the elementary school due for 1981.

24. Vocational Schools:

The closest vocational schools are at Burin, 70 miles away and at Clarenville, 60 miles away.

25. Access to Medical Facilities:

Terrenceville has a medical clinic which is visited regularly by a doctor from the local area. The closest hospital is either at Come By Chance or Burin.

26. Highway Access:

Terrenceville is connected to the Trans Canada Highway by the Burin Peninsula Highway, Route 210. A 7 mile gravel road leads to the town from this route.

27. Rail Access:

There is no rail access.

28. Airport Access:

The nearest D.O.T. airport is St. John's, approximately 240 km to the east.

Environmental Preview

29. Natural Environment:

Terrenceville is situated within Moose Management Area 30 and is adjacent to two others. All are designated as having a low capability for sustaining moose. In 1979, there were 180 animals killed in a population estimated at 638.

Seabirds and Waterfowl

The site is just south of a designated habitat for Canada Geeze and other waterfowl.

Fisheries

In 1979, there were 967 fishermen operating out of Terrenceville with 475 boats, 18 of which are over 46 feet in length. Total landings were in excess of 69 million pounds with a value of over $7.5 million.

Agriculture - no conflict.

Forestry - no conflict.

Recreation

The Terrenceville area is believed to have a considerable potential for recreational usage.

30. Acoustic Change:

Site is not chosen.

31. Visual Aesthetics:

Unknown.

Social and Economic Considerations

32. Community Services:

Terrenceville has very little in the way of facilities and services and is not in close commuting distance to the larger centres of Clarenville or Marystown. Any development in the town would have to parallel the development of local infrastructure.

33. Demographic Change:

The town had a population of 764 in 1976 which is believed to have increased to approximately 1000 today. No major increase in population is anticipated and growth will remain natural unless some industrial development takes place.

34. Labour Force Characteristics:

There is a total labour force in the Terrenceville area of 1,619 approximately 368 of these are female labourers. Terrenceville has a very high rate of unemployment and those who are employed work primarily outside of the town.

Very little detailed information is available on skills of the employed or unemployed in the region. During January, 1981, the unemployment commission reports that 515 construction workers were the largest unemployed group. Other large groups were processing and transport.

Pre-Conditions for Site Suitability

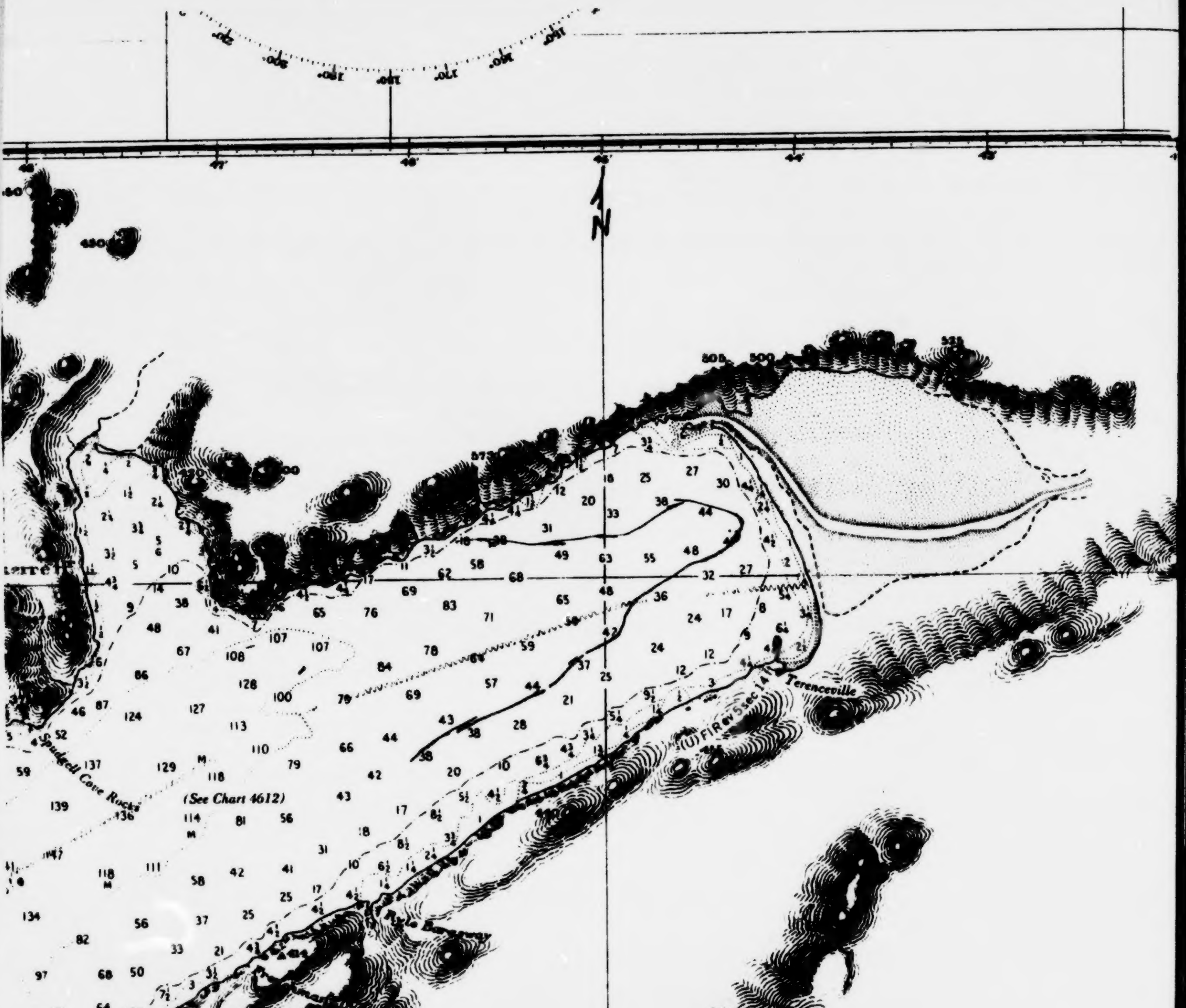
35. Constraints:

- a site will have to be defined. There is very little land available for development of any kind.
- development on town site could have adverse acoustic effects.
- local gravel road needs upgrading and possibly a whole new section will have to be built to avoid traffic movement through the town.
- upgrading of local infrastructure and services.

36. On Site Development Costs

- graving dock	$ 21,000,000
- wharf	3,500,000
- highway upgrading	2,800,000
- contingencies	1,400,000
Total	$ 28,700,000

The cost of providing internal industrial services, local and social services will be extra.


N
Terrenceville
(U) Fl ev 5 sec 14
Spudgell Cove Rocks
(See Chart 4612)
47'
46'
45'
44'
43'

TERRENCEVILLE

HEAD OF FORTUNE BAY

CONTINUATION ON SAME SCALE (1:36,750

Mag. Varn. 28° 45′ W.(1955) decreasing 2′ annually.

PRELIMINARY EVALUATION
TORBAY AIRPORT
AS A LOCATION FOR AN
AIR-RELATED INDUSTRIAL PARK
IN CONJUNCTION WITH
ONSHORE PETROLEUM RELATED DEVELOPMENTS

TORBAY AIRPORT

General Description

Torbay Airport, situated in the capital city of St. John's, on the east coast of the Avalon Peninsula is presently the focus of a major St. John's Airport Environs Development Study. This study was initiated to determine the optimal planning uses for both the airport and the surrounding area to enable St. John's to realize its full potential as a centre for offshore petroleum industry.

An interim report was submitted in December, 1980, by Plan Search Consultants summarizing existing and proposed land uses, road network and services, airport operation, oil and gas related requirements and factors affecting the potential development of the Airport Environs Area.

Site Description

The Torbay Airport Development Area contains approximately 543 hectares. The area is adjacent to the Airport which occupies a total of 631.8 hectares. Land uses within the Development Area cover residential, commercial, industrial, agriculture, open space and unzoned areas.

Growth in aviation activity, if we take Aberdeen as an example, will occur both in scheduled and non-scheduled aircraft movements. The more significant of these factors with respect to offshore petroleum activities is the non-scheduled flights (helicopter and fixed wing or general aviation activity).

In Aberdeen prior to the oil boom (1969-70) non-scheduled flights accounted for less than 1% of all traffic movement. In 1979-80, helicopter movements accounted for 31% of all air transport movements and twin turbos, 15% of total air transport movements related almost totally to petroleum industry. While it is not assumed that Torbay Airport will reach the same growth level as Aberdeen, growth in aviation activity will increase significantly, the demand becoming greater in the development and production stages.

The St. John's Airport Environs Study will determine which aspects or businesses of the offshore oil industry have

a) an essential airport location requirement

b) preferred airport proximity requirement

c) an airport access requirement

d) no requirement for airport location, proximity or access

and using the criteria established by the North East Scotland Development Authority (NESDA) in 1970 determine how much industrial land will be required for airport related uses.

The criteria used at that time were:

1. The industry had to be aviation-oriented.
2. The industry had to be prepared to pay a high cost for the prime land location.
3. The industry had to clearly demonstrate an essential link to both the airport and to the offshore industry.

As a final report on this study is expected in a month it would be dangerous to speculate on the likely growth pattern and the expected demand for industrial air related use. There is no doubt however that Torbay Airport will be the focus of increased aviation activity in support of offshore petroleum operations. The impact however cannot be determined until the data base and assumptions on scale of development, technology, speed of development, business response has been thoroughly assessed.

We recommend that the industrial land required for air-related use be acquired by the Newfoundland and Labrador Housing Corporation and be developed and managed by them. To this end, efforts should be continued to gain freehold title to the land currently leased from the Ministry of Transport (the former RCAF station, Torbay).

APPENDIX A

Guidelines for Development Proposals

DRAFT PROPOSAL DOCUMENT

1. Development proposals are hereby invited for the development, design and construction of one or more of the following facilities, located at one or more of the designated sites listed in the appendix to this document:

    1. Supply/Service Base.
    2. Steel Platform fabrication facilities.
    3. Concrete Platform fabrication facilities.
    4. Module Fabrication/assembly facilities.

   The proposal document, complete with the information specifiied hereunder, shall be delivered to the Minister of Development, 5th Floor, Atlantic Place, St. John's, prior to 4 P.M. on Friday, May 1st, 1981. A security desposit, in the form of a certified cheque payable to the Exchequer Account, Government of Newfoundland and Labrador, in the amount of $50,000., must accompany each development proposal. This desposit will be returned to proponents at the end of the 30 day evaluation period. Prospective developers should be aware of the provisions of the Newfoundland and Labrador Petroleum Regulations, 1977, and are directed, in particular, to regulations 124 and 126, dealing with local labour, goods and services.

2. The proposal document shall contain the following information:

(a) the location of the proposed development along with a complete description of the proposed development.

(b) the names of the directors and senior management of the firm or company making the proposal and the address of the company making the proposal.

(c) information sufficient to enable the Minister to judge the technical capability of the developer in the activities described in the proposal.

(d) information sufficient to enable the Minister to judge the financial capability of the developer.

(e) the method by which the developer proposes to finance the design, construction and operation of the facility.

(f) proposed design/construction schedule and a schedule of the cash-flow related to the design/construction activities associated with the development.

(g) a complete list and description of all new publicly-funded infrastructure that the developer anticipates will be required in support of his proposal, as well as a description of the infrastructure that the developer proposes to provide at his own cost.

(h) a detailed list and description of the goods and services that it is expected will be obtained from within the Province of Newfoundland and Labrador.

(i) a detailed list and description and probable origin of the goods and services to be obtained outside the Province of Newfoundland and Labrador.

(j) an estimate of the value of goods and services for each of the items listed in (h) and (i) above.

(k) A complete statement (broken down by numbers of persons and trade) of the direct employment expected to be generated by (a) the construction of the facility, and (b) the ongoing operation of the facility, as well as a description of the manpower training and upgrading plans that the developer proposes to implement.

3. The proposal submitted in response to this invitation will be judged by the Minister on the basis of the information submitted in Section 2 above. The Minister may accept or reject any or all proposals. Proposals will initially receive conditional approval, with final approval being conditional on:

(a) compliance with all requirements of The Environmental Assessment Act, and any regulation made thereunder.

(b) the provision of a surety, in a form acceptable to the Minister, that the developer will adhere to his schedules for design, construction and subsequent operation.

(c) the provision of a surety, in a form acceptable to the Minister, that the developer will restore and rehabilitate the site of his development as well as specified by the Minister of Environment at the time of environmental approval.

(d) such other conditions as the Minister may prescribe.

(e) If the development proposal submitted for approval is directly related to the development and production activities of the Hibernia resevoir, approval of the proposal shall be contigent upon the prior approval of the Hibernia development **program** as specified in sections 61 and 62 of The Newfoundland and Labrador Petroleum Regulations, 177, issued under the Petroleum and National Gas Act.

4. Proposal documents shall be signed by an authorized signing officer of the company or consortium submitting a proposal, and shall have the corporate seal of the company affixed to the proposal documents.

APPENDIX B

TABLES

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22. INFORMATION SHEET, Clarenville, Newfoundland

23. A PROPOSAL OF SHOREBASE SITE LOCATIONS FOR OIL EXPLORATION OFF THE NORTHEAST COAST OF NEWFOUNDLAND AND LABRADOR; The Hewlett Group Limited, St. John's, 1980

24. THE MUNICIPAL PLAN FOR THE TOWN OF STEPHENVILLE, Provincial Planning Office, Municipal Affairs, 1980

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PROVINCIAL GOVERNMENT AGENCIES

1. Department of Municipal Affairs

The Provincial Planning Office provided preliminary evaluations for all 32 sites nominated for onshore oil related development with particular regards to municipal, physical, environmental and soci-economic status. Available town plans were also supplied.

2. Department of Mines and Energy

Geological formation and surficial geology characteristics were provided for all sites upon request.

3. Department of Environment

Hydrological characteristics were provided for some eleven sites.

4. Department of Forestry

Information with regard to potential forestry conflicts and sawmill operations were provided for the areas nominated for development. The Department supplied topographic maps for these areas also.

5. Department of Agriculture

Information with regard to existing and proposed agriculture development areas and possible conflicts were provided for all areas nominated for onshore oil related development. A agriculture soil map of the Avalon was also obtained from this source.

6. Department of Tourism, Recreation and Culture

Wildlife information, particularly with regard to moose and caribou kills were provided by this Department.

7. Department of Health

An inventory of hospitals and associated medical facilities and personnel were provided by this Department for sites nominated for onshore development.

8. Department of Transportation and Communications

Estimated costs of proposed road projects were provided by this Department when requested. The Department provided information on proposals, roads under construction and those completed.

9. Various Schools Boards

The various school boards around the Province supplied information on schools, enrollment, teachers, vacancy rates, etc.

10. Newfoundland and Labrador Hydro, Newfoundland Light and Power Co.

Information concerning electrical power availability were made available by the above groups.

11. Department of Education

Vocational education information was supplied by this Department.

12. Newfoundland and Labrador Housing

Information on the residential housing bank was compiled by the corporation for some sites.

FEDERAL GOVERNMENT

1. Public Works Canada

This federal department was kind enough to provide nautical charts, some soil investigation reports and drawings of existing wharves and harbour facilities on many sites nominated for development.

2. Department of Fisheries and Oceans

Information was made available for fish landings, value and fishing effort not to mention data on salmon rivers for nominated sites by this government department.

3. Environment Canada

Meteorological data was made available through Atmospheric Environment Services.

4. Unemployment Insurance Commission

Labour force characteristics were based upon information supplied by the commission.

5. Statistics Canada

Statistics Canada provided information upon taxpayers in the areas nominated for developed.

6. Department of Industry, Trade and Commerce

Recreational facilities were made known as extracts from community profiles compiled by this Department in 1979. Information on geology, forestry, agriculture and industrial land banking was also made available.